Vol. 9. No. 10 pp. 671-748. October, 1939

THE VETERINARY BULLETIN

1939

WEYBRIDGE:
IMPERIAL BUREAU OF ANIMAL HEALTH
WEYBRIDGE, SURREY
ENGLAND

Price 5/- net Annual Subscription £2

Imperial Agricultural Bureaux.

EXECUTIVE COUNCIL.

F. J. DU TOIT, *Chairman*	South Africa.
Sir DONALD FERGUSSON, K.C.B.	United Kingdom.
Dr WILLIAM ALLEN	Canada.
F. L. McDOUGALL, C.M.G.	Australia.
NEVILL L. WRIGHT, F.I.C., D.I.C.	New Zealand.
J. M. ADAMS, F.R.C.Sc. (I)	Eire.
SHAMALDARI LAL, I.C.S., Deputy High Commissioner ...	India.
D. JAMES DAVIES, C.B.E.	Newfoundland.
B. F WRIGHT...	Southern Rhodesia.
J. A. CALDER	Colonies, Protectorates and Mandated Territories.
Sir DAVID CHADWICK, K.C.M.G., C.S.I., C.I.E.	Secretary.

STAFF OF IMPERIAL BUREAU OF ANIMAL HEALTH, WEYBRIDGE.

Director:

W. HORNER ANDREWS, D.Sc., M.R.C.V.S.

Deputy Director and
Editor of The Veterinary Bulletin and of Index Veterinarius:

W. A. POOL, M.R.C.V.S.

Second Officer:

J. TWEEDALE EDWARDS, M.R.C.V.S.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 9.] October, 1939. [No. 10.

DISEASES CAUSED BY BACTERIA AND FUNGI

—. (1938). **Discussion on Bovine Mastitis.** [Speakers: HOPKIRK, C. S. M., MINETT, F. C., STABLEFORTH, A. W., EDWARDS, S. J., HENRY, M., OLVER, A. DATTA, S. C. A., KAY, H. D., WHITTY, J. D., & HAMMOND, J.]—*Rep. 1st Imp. vet. Conf. Lond., 1938.* pp. 62-67.

General agreement was expressed regarding the economic importance of bovine mastitis, many speakers also referring to the high incidence of infection in most countries for which data were available. HOPKIRK and KAY also referred to the difficulty of making satisfactory cheese from mastitis milk even though it showed no gross abnormality. There was some difference of opinion regarding the relative importance of streptococci, MINETT and others taking the view that it was of paramount importance and that measures should be directed firstly to the suppression of this form of mastitis, whereas HOPKIRK expressed his belief that—at any rate so far as conditions in New Zealand were concerned—staphylococci were of nearly equal importance and that other organisms, *e.g.* micrococci, often gave rise to a low grade mastitis which should not be left out of account. This difference of opinion regarding the relative importance of streptococci and in particular *Streptococcus agalactiae* has been partially if not mainly responsible for a further divergency of views between HOPKIRK on the one hand, and MINETT and his colleagues on the other; the latter believe that direct cultural examination in one or other way is necessary because infections with *Str. agalactiae* and other streptococci—in their view of prime importance—can only be distinguished in that way, while HOPKIRK believes that an indirect method which he has used on a large scale in New Zealand, *viz*, microscopic examination of films of gravity cream and assessment of the number of leucocytes, is a more satisfactory method. He also regards its cheapness and simplicity as another important advantage. That a relatively simple combination of culture and identification by serological methods is practicable was indicated by the remarks of MINETT, STABLEFORTH and EDWARDS; the latter referred to the method, which he had recently tested, of cultivating gravity cream in crystal violet broth containing sodium azide. STABLEFORTH dealt briefly with the serological aspect, quoting results to show that one serological type was nearly always preponderant in a given herd.

It was agreed that infection *via* the teat was the usual method, and that it was important to maintain good general teat hygiene by careful handling, and to treat sores promptly if they could not be prevented. HOPKIRK emphasized his

view that many latent infections are confined to the teat and sinus. Several speakers referred to the possibility of hereditary susceptibility which might be dependent on anatomical peculiarities. KAY and DATTA also raised the possibility of hormonal imbalance being an important factor. STABLEFORTH referred to the good results which followed udder infusion with entozon, or better, acriflavine, left in for five minutes in lactating animals or up to 24 hours in others. He also referred to experiments with treatment by means of sulphanilamide. MINETT also gave a description of some work he had done which showed that a toxoid might be of some value in mastitis in sheep, which was frequently of staphylococcal origin. MINETT and HOPKIRK each prepared an additional memorandum on the diagnosis of mastitis; these memoranda are printed at the end of this discussion.

DAVIS, J. G., MCCLEMONT, J., & ROGERS, H. J. (1939). **Studies in Mastitis. I. The Routine Diagnosis of Mastitis.**—*J. Dairy Res.* **10.** 59-73. 7 tables. [Numerous refs.]

DAVIS, J. G., & MCCLEMONT, J. (1939). **Studies in Mastitis. II. A Comparison of Methods for the Detection of Subclinical Mastitis.**—*Ibid.* 74-80. 5 tables. [7 refs.]

MCCLEMONT, J., & DAVIS, J. G. (1939). **Studies in Mastitis. III. Mastitis in Relation to " Udder Counts ". IV. Mastitis in Relation to the Methylene Blue Reduction Test.**—*Ibid.* 81-87 and 88-93. 1 fig., 12 tables. [16 refs.]

DAVIS, J. G., & MCCLEMONT, J. (1939). **Studies in Mastitis. V. Mastitis in Relation to Cheese-Making. VI. General Observations, Summary and Conclusions.**—*Ibid.* 94-103 and 104-107. 1 fig., 12 tables. [15 refs.]

I. For routine diagnosis of mastitis bromcresol purple paper tests are carried out on the fore milk, followed by mixed sampling of the early mid-milk. Samples are taken during the afternoon milking. Obviously bad quarters are sampled separately. The samples are plated immediately on returning to the laboratory on blood crystal violet aesculin agar (Edwards' medium), plain blood agar, milk agar, and occasionally other media. It is suggested that if it is only the incidence of mastitis that is under investigation, plain blood agar can be used alone. Except in obvious cases, colonies suspected to be *Str. agalactiae* are picked off and incubated in yeast dextrose litmus milk for confirmation. Further subcultures are made into hippurate broth, the hydrolysis of which is the most specific biochemical characteristic of *Streptococcus agalactiae*. Each cow is tested twice at an interval of not less than 10 days. The significance of small numbers of organisms in otherwise normal udders is obscure, but in eradication such cases are considered positive.

II. A comparison between twelve common methods, including cultural and ferment tests, of detecting subclinical mastitis revealed that none was of value for eradication purposes. It is unlikely that any combination of these simple methods would form a satisfactory method of diagnosis.

III. Observations over a long period have shown that milk samples from cows with mastitis have higher " udder counts " than those from normal cows. An investigation of this aspect was undertaken with a view to its possible usefulness in diagnosis. It was found that only rarely did a sample with a count of <100 come from an infected cow, and it was concluded that for eradication schemes this count might be taken as an indication of the absence of mastitis. A sterile plate or one with a very low count should, however, be looked upon with suspicion, as it may indicate severe mastitis or injury resulting in the presence of blood and plasma in the milk. It appears that very few uninfected cows give a count of >500 and none $>2,000$. In practice, therefore, a count of 1,000 may be taken as indicative of mastitis.

IV. The effect of mastitis on the methylene blue test is obscure, but it appears that changes in the chemical composition of the milk tend to lengthen the time of reduction. The test in its official form, however, is of no value for the detection of the disease.

V. Mastitis exerts a deleterious effect on milk for cheese-making. Mild mastitis lowers the lipase content of the milk and hence influences the flavour of the cheese, while severe mastitis causing definitely abnormal milk results in cheese of poor texture and weak body with low ash and calcium. Mastitis also significantly lowers the content of vitamins B_1, B_2, and C, and tends to inhibit the growth of starter organisms.

VI. The incidence of mastitis increases with age. There is, however, an appreciable incidence in first calf heifers. Older cows usually give milk with a higher bacterial count, but this is due entirely to the increased incidence of mastitis. It is emphasized that for eradication purposes simple tests on the farm, used in conjunction with carefully controlled bacteriological examination in the laboratory, give satisfactory results.—D. D. OGILVIE.

EDWARDS, P. R., & HULL, F. E. (1937). **Hemolytic Streptococci in Chronic Peritonitis and Salpingitis of Hens.**—*J. Amer. vet. med. Ass.* **91.** 656-660. [10 refs.]

The authors review the references made in the literature to streptococcal infections in poultry. In the outbreak reported, haemolytic streptococci were isolated from the internal organs, peritoneal exudate and inflamed oviducts. These organisms proved to belong to Lancefield's Group C.

1 c.c. of a 24-hour broth culture killed hens when given intravenously and intraperitoneally. In birds which had been injected intravenously, the lesions seen at autopsy were those of a septicaemia with slight peritonitis ; intraperitoneal injections resulted in an arthritis with pericarditis. The mode of natural transmission was not clear ; the pathological changes indicated the possibility of infection through the genital tract. [No mention is made of any similar condition in the genital tract of associated male birds or the isolation of a similar organism from such birds].—L. E. HUGHES.

DE BLIECK, L., & JANSEN, J. (1938). Het desinfecteerend vermogen van Citopogeen op streptococcen. [**Disinfectant Action of " Citopogeen " on Streptococci**].—*Tijdschr. Diergeneesk.* **65.** 209-212. 9 tables. [3 refs.] [English, French and German summaries].

The authors studied the disinfectant action of " citopogeen " *in vitro* on strains of streptococci isolated from a human being, a horse, a bovine, a pig, an ape, a mouse, a raccoon and a woodcock, and found it in all cases more powerful than carbolic acid. All cultures were killed by 1 % " citopogeen " within two minutes, except one strain from a silver fox, which was killed within six minutes by 1 % " citopogeen ", and within two minutes by 2 % " citopogeen " ; this strain was also more resistant to carbolic acid.—JAC. JANSEN (UTRECHT).

IVANIĆ, S. (1938). Kad se javljaju bacili prostrela u krvi ? [**The Time of Appearance of Anthrax Bacilli in the Blood**].—*Glasn. hig. Zav.* **21.** 6-8. 2 tables. [German summary].

A series of g. pigs were inoculated subcutaneously with a suspension of virulent anthrax bacilli, in the digits of their hind-feet. The digits were then cut off after certain intervals, and the blood was tested for anthrax bacilli. It was

found that no animals survived unless the digits were cut off within 20 minutes of inoculation. Bacilli could be detected in the blood 140 minutes after injection. —B. OSWALD (KRIŽEVCI).

IVÁNOVICS, G. (1939). Die theoretische Grundlage der Thermopräcipitationsreaktion nach Ascoli. **[The Theory of Ascoli's Anthrax Precipitation Test].** —*Arch. wiss. prakt. Tierheilk.* **75.** 75-84. [Numerous refs.]

A brief review of the present-day conception of the antigenic structure of the anthrax bacillus is given [*V. B.* **9.** 601.], reference being made to the nucleoprotein somatic antigen which is type-specific, and to the polysaccharide capsular antigen which is common to other members of the genus. Many samples of commercially prepared anti-anthrax serum contain mainly anticapsular antibody, and such serum is unsuitable for use in the Ascoli test because it will give non-specific reactions.—E. J. PULLINGER.

JEŽIĆ, J., KODRNJA, E., & MIKIČ, F. (1938). Oko značenja kože u vakcinaciji protiv antraksa. **[Importance of the Skin in Anti-Anthrax Vaccination].** —*Arhiv Minist. Poljopriv., Belgrade.* **5.** No. 12. 3-48. 14 figs., 15 tables. [Numerous refs.] [French summary].

The importance of the skin as the site of immunity is discussed. Rabbits were vaccinated against anthrax either intradermally or subcutaneously, and their immunity was tested. It was observed that intradermal injection of the vaccine caused a higher loss due to vaccination but gave a stronger immunity. The article is a general review of the situation.—B. OSWALD (KRIŽEVCI).

BARTELS, & NICOLAUS. (1937). Milzbrandschutzimpfungen unter Berücksichtigung der Lanolin-Vakzine. **[Immunization against Anthrax with Lanoline Vaccine].**—*Dtsch. tierärztl. Wschr.* **45.** 525-527. 2 tables.

This lanoline vaccine (made by the Farbenindustrie A.G.) is rubbed into the skin after scarification. It was less effective than Besredka's intradermal method of immunization, which gave a more lasting immunity. During the years 1929-1933 there was no case of infection after immunization by Besredka's method, whereas in 1936 when the lanoline vaccine was tried, there were four fatal cases of anthrax (0·18% of the vaccinated animals).—V. CHLÁDEK (PRAGUE).

I. WIGHT, A. E. (1938). **Progress and Status of Co-Operative Tuberculosis Eradication Work.**—*J. Amer. vet. med. Ass.* **92.** 444-450.

II. FAULDER, E. T. (1938). **The Eradication of Tuberculosis in the Herds of New York State and the Accreditation of the State.**—*Ibid.* 450-453.

I. During the year ended 30th June 1937, 13,750,000 cattle were tested with tuberculin under the federal scheme ; the percentage of reactors was 0·7 as in the previous year. The appropriations for the year amounted to $4,500,000 from state and $1,500,000 from federal sources, and $2,700,000 from federal emergency funds. On the 1st October 1937 there were 272,000 accredited herds and during the year 1st November 1936 to 30th October 1937, 93 counties qualified for inclusion as modified accredited areas, that is, the incidence of TB. had been reduced to less than 0·5%. Details are given of work carried out on the control and eradication of avian TB. A decrease in the amount of TB. found in cattle and swine at abattoirs is recorded, 0·15% of cattle and 9·3% of swine being affected.

II. In 1918 the incidence of TB. was about 40% and it was reduced by 1937 to 0·5%. 153,000 herds, consisting of two million cattle, were tuberculin

tested and retested, and compensation amounting to $57,000,000 was paid for the 965,000 reactors. The area plan of testing was adopted and the importance of cleansing and disinfection of infected premises emphasized. Proposals for future tuberculin testing in the State are indicated.—J. C. WALLACE.

PLUM, N. (1939). **Statistical Comments on Tuberculosis and Tuberculin Tests.** —*Skand. VetTidskr.* **29.** 105-132. 1 fig., 10 tables. [In English : Swedish summary].

In collaboration with veterinarians in practice and in abattoirs, a tuberculin test survey was made in different parts of Denmark and autopsies were carried out on 2,079 cattle, from tuberculous areas, which gave a reaction of not less than 3·5 mm. to the intradermal tuberculin test.

P.M. examination showed the test to give a reliability percentage of 96·73. In 68 of the carcasses no tuberculous lesions were detected. The respiratory system was more frequently involved than the digestive tract ; the uterus and the udder were found affected in 2·4 % and 1 % respectively of the 1,894 cows examined. The number of carcasses with lesions in the head and neck glands was about the same as those affected in the mesenteric glands. It was found that the number of sites involved increased with age up to the 7-8 year class. The incidence of disease was highest in Jutland. Some breeds appear to be more susceptible than others.

Old tuberculin was used for the tests. By far the biggest reactions were given by animals up to one year old or by recently infected cattle with few lesions.—J. R.

BONGERT, I. G. (1938). Beitrag zur Pathogenese und pathologischen Anatomie der Tuberkulose der landwirtschaflichen Nutztiere unter Berücksichtigung der Ranke'schen Lehre. [**Pathology of TB. in Domestic Animals with Reference to Ranke's Doctrine**].—*Tierärztl. Mitt.* **19.** 875-879. [6 refs.]

This article consists largely of B's views on the pathogenesis of tuberculosis in cattle, in so far as they differ from those expressed in numerous articles by NIEBERLE. In particular, he does not agree with the latter's conception of an incomplete " primary lung complex " in cattle in which the lung alone shows a tuberculous focus, the bronchial glands being free. [The views expressed appear to be based on a misunderstanding of NIEBERLE's views and the only reference to his work is to the text-book published in 1931, since when many of the original statements have been modified].—E. G. WHITE.

KROGH, P. R. (1937). Kvaegbesaetning smittet med Tuberkulose fra Fasaner. [**A Cattle Herd Infected with Tuberculosis from Pheasants**].—*Maanedsskr. Dyrlaeg.* **49.** 525-526.

When the cattle on an isolated farm were tested with tuberculin every autumn, there were always several reactors, and it was found that the infection was due to the avian type of bacillus. No poultry were kept on the farm, but dead pheasants from the surrounding woods were frequently found to be infected.

—H. C. BENDIXEN (COPENHAGEN).

PLUM, N., & SLYNGBORG, N. C. (1938). Smittefarlig Tuberkulose (specielt Lungetuberkulose) hos Svin. [**On the Infectivity of Tuberculosis in Swine, Especially Pulmonary Tuberculosis**].—*Maanedsskr. Dyrlaeg.* **50.** 473-478.

The authors believe that tuberculosis of the uterus, udder and lungs is the most dangerous form of open tuberculosis in swine, but that tubercle bacilli may be excreted from ulcers and abscesses in some cases. In a district with a high

incidence of bovine TB., 28% of the sows slaughtered in the abattoirs were infected and in 1·47% of these there were macroscopic lesions in the uterus. Udder TB. is estimated to be two or three times as frequent as TB. of the uterus. In 96 cases of extensive lung TB., mucus from the trachea was homogenised and cultivated in Besredka's and Löwenstein's media; 24% of these samples were found to contain tubercle bacilli.—H. C. BENDIXEN (COPENHAGEN).

MIHAILESCU, M., LUPU, A., & TOMESCU, V. (1938). Recherches anatomo-pathologiques et microbiologiques sur la tuberculose du chien. [**Pathology and Bacteriology of TB. in Dogs**].—*Arhiva vet.* **30.** No. 5. 1-29. 16 figs. [16 refs.] [In French: German summary].

This article consists almost entirely of an anatomo-pathological study of TB. in dogs. The authors found that the disease occurred almost entirely in domesticated dogs, only one case being found in 6,000 pariah dogs. In domesticated dogs the incidence was about 2% of 2,000 dogs examined.

The lesions were always productive in type; in fact this feature was often so pronounced that the lesions appeared almost neoplastic in nature. Exudative processes were also encountered, particularly in the pleural and pericardial cavities.

Microscopically the tuberculous reaction was characterized by epithelioid cells with a peripheral zone of lymphocytic cells. Langhan's giant cells were uncommon, and calcification was rare. Usually the tubercles were encapsulated, and new vessels could be seen. The inapparent lesions described by NIEBERLE, characterized by epithelioid proliferation, were not seen by the authors.

The primary focus was found nine times in the intestine, and five times in the lungs. Fibrous caseation was usual on the serous surfaces, and the productive character of the lesions generally shows the relative resistance of the dog to TB. The dog is considered more resistant than man or bovines.

The dissemination of the bacilli may occur by the lymphatic channels, the blood stream or by direct extension. The authors do not consider that dogs excrete tubercle bacilli commonly, as cavitation of the lungs, skin TB. and tuberculous pyelitis were not usual.

The bacteriological studies are not complete, but the authors' results to date suggest that the strains they isolated were of the human type.—D. L. HUGHES.

FELDMAN, W. H. (1938). **The Occurrence of Avian Tubercle Bacilli in Dressed Poultry.**—*J. infect. Dis.* **63.** 332-336. 1 fig., 1 table. [4 refs.]

The spleens of 125 dressed poultry (66 "springers," 30 adult hens, 3 capons, 4 turkeys, 18 domesticated ducks and 4 wild ducks) were examined for tubercle bacilli by cultural methods. Avian tubercle bacilli were demonstrated in four (one "springer," two adult hens and one domesticated duck), the strains being tested for pathogenicity for g. pigs, rabbits and chickens. F. concludes that dressed poultry originating in districts where avian tuberculosis is prevalent may harbour virulent avian tubercle bacilli though the fowls are in good condition and show no macroscopic lesions of the disease. F. points out the necessity of rearing fowls in an environment free from TB.—HUGH N. SPEARS.

I. SAENZ, A. (1938). Recherches sur les caractères biologiques du bacille tuberculeux aviaire. [**The Biological Characters of Avian Tubercle Bacilli**].—*Ann. Inst. Pasteur.* **61.** 662-704. 6 figs., 6 tables. [Numerous refs.]

II. GRIMAL, R. (1938). Variations de la formule leucocytaire et du rapport lympho-monocytaire dans la tuberculose aiguë de la poule. [**Variations of**

the Leucocytic Count and of the Lympho-Monocytic Ratio in Acute Tuberculosis of the Hen].—*C. R. Soc. Biol. Paris.* **128.** 655-657. 2 figs. [6 refs.]

III. BONNET, H., & LEBLOIS, C. (1939). Recherche du bacille tuberculeux aviaire dans les oeufs provenant de poules tuberculeuses. Absence de bacille dans les oeufs de poules infectées expérimentalement. [**Research on the Presence of Avian Tubercle Bacilli in the Eggs of Experimentally-Infected Hens**].—*Ibid.* **130.** 630-631.

I. The technique of isolation of avian tubercle bacilli from bone-marrow and contaminated material and its growth on various selective media is described. A glycerinated egg base is regarded as essential for favourable results. Details are given of the varied morphology of avian tubercle bacilli as a diagnostic feature. The experimental infection of 28 pullets by ingestion of tuberculous material or cultures, confirmed the oral route as the natural path of infection. 20 strains of bacilli were injected intravenously into hens and rabbits in graded doses and the pathology of the resultant acute, subacute and chronic types of the disease is described. Four strains were found to retain their original virulence for six years after storage on selective media in the dark at room temperature. Three recently isolated strains were progressively attenuated by serial culture on glycerinated potato to which bile had been added. Dissociation on glycerinated potato is described in detail, followed by a study of the pathogenic properties of both variants and of their evolution *in vitro* and *in vivo*. The production of S and R strains of irreversible stability is demonstrated and characters are given which distinguish them from BCG strains. Pigmentation was not associated with alteration in virulence.

II. Daily leucocyte counts were performed with two hens infected with a very virulent avian strain of *Mycobacterium tuberculosis*, and compared with the average count obtained with 11 control hens. An initial lymphocytosis lasting for a week was followed by a mononuclear leucocytosis. There was a terminal polymorphonuclear leucocytosis with the disappearance of granular eosinophiles. The gravity of infection was correlated with a gradual decrease in the number of lymphocytes and in the lympho-monocytic ratio.

III. Laying hens were each injected intravenously with 1 mg. of virulent avian tubercle bacilli, and the contents of 12 eggs laid from the 12th to the 25th days after injection were sown in 1 c.c. amounts in tubes of glycerinated egg medium. Incubation at 37°C. for four months gave negative results. The yolks of eggs laid from the 5th to the 27th days after injection were injected intravenously in doses of 1-10 c.c. into 13 hens. P.M. examination after 84-270 days proved negative in every case. The authors conclude that disease in man due to the avian tubercle bacillus is rarely derived from the eggs of tuberculous hens.

—R. O. MUIR.

SAENZ, A. (1938). Caractères différentiels des bacilles isolés du cobaye neuf et des bacilles aviaires avirulents. [**Differential Characteristics of Acid-Fast Bacilli Isolated from Healthy Guinea Pigs and of Avirulent Avian Tubercle Bacilli**].—*C. R. Soc. Biol. Paris.* **128.** 594-597. 2 tables. [11 refs.]

Two groups of 12 guinea pigs, 45 days after an intramuscular injection of smooth strains of acid-fast bacilli from healthy g. pigs in the case of one group, and of a smooth strain of avirulent avian tubercle bacilli in the case of the other, received 0·0001 mg. of rough virulent human tubercle bacilli intramuscularly. Culture on Löwenstein's medium of the spleen and sublumbar lymph nodes of g. pigs from each group, killed at intervals after the eighth day, showed that the human bacilli

spread less rapidly in the first than in the second group of g. pigs. Subdural injection of eight rabbits with acid-fast bacilli from healthy g. pigs caused death with paralytic symptoms in 16-30 days, while 17 rabbits survived a similar dose of avirulent avian tubercle bacilli by the same route. Rabbits surviving intravenous injection with the g. pig strains of acid-fast bacilli showed no lesions at autopsy after 4-6 months. Rabbits injected (intraven.) with avirulent avian tubercle bacilli showed osteo-arthritic lesions P.M. after 5-7 months.—R. O. MUIR.

VAN DEINSE, F. (1938). Nouvelles expériences de prémunition de lapins vis-à-vis de bacilles tuberculeux aviaires, au moyen de bacilles homologues, tués par chauffage. [**Experiments on the Premunition of Rabbits against Avian Type Tubercle Bacilli with Homologous Heat-Killed Bacilli**].—*C. R. Soc. Biol. Paris.* **129.** 649-651. [6 refs.]

36 rabbits received 1-3 intravenous injections of 1 mg. of heat-killed avian tubercle bacilli suspended in 1 c.c. of normal saline. Of the 26 rabbits that survived, 23 received an intravenous dose of 0·1 mg. of live bacilli 5-73 days after vaccination, and three, 206 days after vaccination. Four rabbits, tested 11-59 days after vaccination, died in 7-12 days with a P.M. picture similar to that found in the seven control rabbits, which died of the acute Yersin type of tuberculosis in 15-30 days and did not show macroscopic caseous lesions. Eight rabbits, tested 5-56 days after vaccination, died after the usual interval for the benign Yersin type of TB., while thirteen died after 46-158 days, the period of survival increasing with the interval between vaccination and infection. The Yersin type of TB. (toxic infection) could not be produced by the test dose in rabbits 60 days after vaccination. In the author's opinion, vaccination with dead avian bacilli produced an allergic state followed by a gradual desensitization, rather than a true immunity. —R. O. MUIR.

I. AJO, C. (1938). Allergie et immunité conférées au cobaye par les bacilles tuberculeux avirulents vivants et virulents tués par chauffage (employés séparés et associés). [**Allergy and Immunity in a G. Pig Produced by Live Non-Virulent and Virulent Heat-Killed Tubercle Bacilli**].—*C. R. Soc. Biol. Paris.* **129.** 759-762. 2 tables.

II. SAENZ, A. (1939). Influence de la désensibilisation sur la dispersion des germes de surinfection chez des cobayes rendus hyperallergiques au moyen de bacilles tuberculeux morts enrobés dans l'huile de vaseline. [**Influence of Desensitization on the Dispersion of Tubercle Bacilli Causing Superinfection in G. Pigs Rendered Hyperallergic by Dead Bacilli in Paraffin**].—*Ibid.* **130.** 219-222. [9 refs.]

The relation between allergy and immunity was studied in eight groups of eight g. pigs, which had been injected subcutaneously with BCG vaccine, heat-killed bacilli or a mixture of both. The allergic state was determined at weekly intervals after the final vaccination, by an intradermal test with 0·01 c.c. of crude tuberculin. Immunity was tested by the subcutaneous injection of 0·0001 c.c. of virulent bovine tubercle bacilli. BCG vaccine conferred a far greater resistance to experimental infection than heat-killed bacilli. Combined BCG and heat-killed vaccines produced an increase in allergic reaction but no increase in immunity.

II. A group of g. pigs each received intramuscularly 1 cg. of dead tubercle bacilli in 1 c.c. of paraffin. After 90 days, those g. pigs reacting to 0·0001 c.c. of tuberculin were desensitized at daily intervals by intramuscular injections of crude tuberculin in doses increasing from 20 to 100 cg., until they did not react to 0·1 c.c.

of tuberculin intradermally. They were then super-infected intradermally with 0·0001 mg. of slightly virulent human strain. The desensitized state was maintained by fortnightly injections of 50 cg. of tuberculin. Dispersion of the test dose of tubercle bacilli in this desensitized group was compared with that in an unsensitized and a sensitized group by killing a g. pig from each group at given intervals and culturing lymph nodes, spleen and lungs on a malachite-green asparagine egg medium. Similar retardation of dispersion in both sensitized and desensitized g. pigs showed that dermal sensitivity to tuberculin was not essential for immunization.—R. O. Muir.

Carvalho, A., & Vidal, C. (1938). Tuberculisation de la plèvre. **[Tuberculous Infection of the Pleura].**—*C. R. Soc. Biol. Paris.* **127.** 235-236.

P.M. examination of six rabbits, two months after pneumothorax, and subsequent intrapleural injection of 0·1 c.c. of a suspension of tubercle bacilli, demonstrated the presence of a general infection and pleural lesions without an exudate. Three strains recovered from the pleura were compared with the original strain by subcutaneous injection into eight g. pigs, and were shown to have increased in virulence.—R. O. Muir.

I. Lurie, M. B. (1939). **Studies on the Mechanism of Immunity in Tuberculosis. The Rôle of Extracellular Factors and Local Immunity in the Fixation and Inhibition of Growth of Tubercle Bacilli.**—*J. exp. Med.* **69.** 555-578. 2 text figs., 17 figs. on 3 plates, 3 tables. [13 refs.]

II. Lurie, M. B. (1939). **Studies on the Mechanism of Immunity in Tuberculosis. The Mobilization of Mononuclear Phagocytes in Normal and Immunized Animals and Their Relative Capacities for Division and Phagocytosis.** —*Ibid.* 579-606. 6 text figs., 13 figs. on 2 plates, 9 tables. [Numerous refs.]

I. The local reactions of rabbits, g. pigs and man to primary and to secondary infections with tubercle bacilli were compared. In the g. pig such reinfection produced an intense local inflammatory reaction, the surrounding lymphatic vessels being completely thrombosed with a very fine-meshed fibrin network which localized infection. In man and rabbits such localization was less effective since the fibrin network formed was comparatively coarse-meshed and the whole inflammatory reaction was less intense. It is concluded that the strong allergic reaction of the tuberculous g. pig mechanically hindered the spread of infection. In both rabbits and g. pigs which were already tuberculous, tubercle bacilli were effectively destroyed at the portal of entry by humoral antibodies, though in the same animal and at the same time these organisms might be multiplying in distant internal organs. It is emphasized that tubercle bacilli can multiply not only by binary fission, but also by splitting into non-acid-fast granules from which acid-fast rods subsequently sprout.

II. In tuberculous rabbits and g. pigs mononuclear phagocytes mobilize at the site of non-specific inflammation with greater rapidity than they do in normal animals and they increase more rapidly by mitotic and by amitotic division. Furthermore, phagocytes taken from such animals exhibit *in vitro* an abnormally high ability for phagocytosing tubercle bacilli. The increased degree of phagocytic digestion (which is dependent upon enzyme activity) is definitely not much influenced by pH effects, but depends rather upon heightened physiological activity of the sensitized animal. It is stressed that this increased activity is a definite character developed by the cells themselves and is not dependent solely upon the presence of specific antibodies (the so-called immune opsonins or bacteriotropins).—E. J. Pullinger.

SMITHBURN, K. C. (1939). **Virulence of Tubercle Bacilli. Its Variation Attendant on Animal Passage.**—*Amer. Rev. Tuberc.* **39.** 116-127. 5 tables. [14 refs.]

S. investigated the variation in virulence of tubercle bacilli in view of its importance in the use of live virulent strains for vaccination, and the possibility of attenuated strains becoming more virulent by host-to-host passage in natural infections.

It was found that the virulence of attenuated tubercle bacilli might be partly or completely restored by serial brain-to-brain passage in g. pigs. This restoration was more complete if the bacilli were not too greatly attenuated in the first instance. In g. pigs, the increase in virulence was accompanied by an increased capacity of the bacilli to survive and multiply in these animals, and the lesions became more acute. S. claims that the virulence of cultures may be indefinitely maintained by this method.—D. L. HUGHES.

DARZINS, E. (1938). Recherches sur l'action de l'huile de pin et de l'huile de chaulmoogra sur les bacilles acido-résistants et sur la tuberculose expérimentale du cobaye. [**The Action of Pine and Chaulmoogra Oils on Acid-Fast Bacilli and Experimental Tuberculosis in G. Pigs**].—*Ann. Inst. Pasteur.* **61.** 172-186.

Cultural experiments with coliform bacilli, staphylococci and acid-fast bacilli demonstrated the superior bactericidal action of pine oil as compared with that of non-volatile oils such as chaulmoogra oil. Histological examination of the lungs of five g. pigs, after daily inhalation of pine oil vapour for three hours over a period of two months, showed slight broncho-pneumonia with marked interstitial proliferation. Another 14 g. pigs were injected subcutaneously with virulent tubercle bacilli, and eight of them were treated with pine oil vapour as above. Three of the untreated g. pigs, killed after three months, showed miliary tuberculosis of the lungs in contrast with three g. pigs which had been treated for a similar period, which showed only a slight bronchitis with marked interstitial proliferation and little caseation. The three surviving untreated g. pigs died of tuberculosis after about four months, while the five g. pigs which had prolonged treatment with pine oil vapour survived for at least eight months; at autopsy of these g. pigs there was interstitial pneumonia with cavitation and necrotic areas. Similar results were obtained in 12 g. pigs infected with tuberculosis by conjunctival instillation. D. concluded that pine oil inhibited the multiplication of tubercle bacilli in the infected lung and stimulated interstitial repair.—R. O. MUIR.

SAENZ, A., & FATIO, D. M. (1939). Synovites tuberculeuses à bacille bovin. Intérêt de l'inoculation sous-occipitale pour établir un diagnostic précoce d'infection bovine. [**Early Diagnosis of Synovitis caused by Bovine Type Tubercle Bacilli. Value of Subdural Inoculation**].—*C. R. Soc. Biol. Paris.* **130.** 624-627. [3 refs.]

Five strains of bovine type *Mycobacterium tuberculosis* were obtained from cases of synovitis in butchers. In each instance the type was established by inoculating 0·01 mg. of the original culture subdurally into rabbits, a method which serves to differentiate bovine from human strains within about 20 days. —R. E. GLOVER.

DEBIESSE, J. (1938). Spectres d'absorption et constitution chimique du liquide de Sauton ensemencé en bacilles tuberculeux B.C.G. [**Spectrum Absorption and Chemical Composition of Sauton's Medium Sown with BCG**].—*C. R. Acad. Sci., Paris.* **207.** 1199-1201. [2 refs.]

In addition to the changes in the chemical composition of Sauton's medium caused by the growth of BCG, modifications were noted in the spectrographic picture. During the first 21 days there was a displacement in the band of absorption of the order of 300 Å with a return towards the violet during the succeeding period of growth.—R. E. Glover.

GERNEZ, C., CRAMPON, P., & GRAUX. (1938). Intérêt du milieu de Bordet-Gengou pour l'isolement et la culture du bacilli tuberculeux. [**Isolation of the Tubercle Bacillus on Bordet-Gengou Medium**].—*C. R. Soc. Biol. Paris.* **128.** 1141-1143. [4 refs.]

Three types of medium were sown with a variety of products suspected of containing tubercle bacilli. The proportion of positive results was :– Löwenstein's medium, 70%, Laporte medium, 63%, and Bordet-Gengou medium, 76%, respectively. Colonies appeared at an earlier period on the Bordet-Gengou medium.—R. E. GLOVER.

BIRKHAUG, K. (1938). **Iathergy in Experimental Tuberculosis.**—*Acta path. microbiol. scand.* Suppl. No. 38. pp. 127-131. [In English].

B. subscribes to the hypothesis of RICH [*V. B.* **4.** 443.] that tuberculin allergy and resistance to TB. are separable states. This was shown by injecting g. pigs directly into the right paratracheal lymph node with about 500 eugonic tubercle bacilli.

In normal g. pigs the organisms spread throughout the body within three days. In tuberculous, allergic g. pigs, previously injected subcutaneously with dysgonic tubercle bacilli, the human strain was held up for five weeks and dispersed within 6-8 weeks, whereas in similar animals completely desensitized with a daily dose of tuberculin, dispersion was prevented for seven weeks, while the subsequent spread was slow.

The term " iathergy " is applied to the state of desensitization in which there is no interference with immunity.—R. E. GLOVER.

CORPER, H. J., & COHN, M. L. (1937). **Thermolability of the Tubercle Bacillus.**—*Amer. Rev. Tuberc.* **35.** 663-677. 3 figs., 4 tables, 2 charts. [19 refs.]

The authors describe some carefully controlled experiments on the thermal death point of the tubercle bacillus in which special attention was directed to avoiding errors in the investigations of previous workers.

The suspensions were carefully graded, and heated in a suitable buffered solution in glass receptacles which permitted an exact estimation of the temperature. Representative samples were withdrawn with precautions as to sterility at regular intervals and seeded on inspissated egg-yolk medium.

A table gives the results of temperatures ranging from 45° to 60°C. At 60°C. dilute suspensions were killed within a few minutes, while at 50°C. they survived for five hours. Between 50° and 60°C. the heat survival followed a logarithmic curve.—R. E. GLOVER.

CONE, J. F. (1939). **Pseudomonas aeruginosa** [*pyocyanea*] **in Bovine Mastitis.**—*J. agric. Res.* **58.** 141-147. 1 table. [Numerous refs.]

An account is given of an outbreak of acute mastitis affecting 17 cows belonging to a dairy herd in Beltsville, Maryland, U.S.A. Milk samples from infected quarters were found to contain fluorescent rods in apparently pure culture. Some of the animals were obviously sick, one running a temperature of 106·8F°. Milk

production was reduced abruptly, and samples of milk were watery, yellow, very lumpy and stringy.

Bacteriological features of the organisms isolated from the diseased quarters are discussed. It was concluded that in this instance *Pseudomonas pyocyanea* was probably the cause of the outbreak of mastitis. The affected quarters became "blind" in two cases, and in others they remained hard and swollen, although secreting milk of normal appearance. Some of the cows continued to shed organisms in small numbers long after the acute attack had subsided, and the milk had become normal in appearance. In view of this fact it is pointed out that the public health significance of *Ps. pyocyanea* in milk should receive consideration.

—R. Isherwood.

Radvila, P. (1937). Immunizavimas prieš kiauliu raudonligę pilnai virulentiškomis glukozidinemis raudonliges kulturomis. **[Vaccination against Swine Erysipelas by Glucoside Vaccine]**.—*Vet. ir Zootech., Kovno.* **14.** 257-267 and 289-300. 1 fig., 4 tables. [18 refs.] [German summary].

The effect of glucoside cultures of *Erysipelothrix rhusiopathiae* was tested on 110 pigeons and 26 pigs, 0·0005 g. saponin and 0·00025 g. digitonin (mixed) being added to amounts of culture equal to 10^{-6} or 10^{-7} c.c. The glucosides intensified the pathogenic action of the organism and lowered its lethal dose, so that R. considers the glucoside method to be useless in swine erysipelas immunization.—A. Pabijanskas (Kaunas).

Rosenbusch, C. T., & Merchant, L. A. (1939). **A Study of the Hemorrhagic Septicaemia Pasteurellae.**—*J. Bact.* **37.** 69-89. 3 tables. [Numerous refs.]

The authors studied 114 strains of H.S. organisms (38 avian, 22 bovine, 18 ovine, 15 porcine, 7 buffalo, 7 equine, 4 rabbit and one each of deer, cat and mink); 44 of these strains are discussed.

A brief review is given of the literature on previous classifications of the members of the pasteurella group. The authors next detail the various techniques of the tests upon which they base their own classification. Pleomorphism obviated typing by morphology. Colony characters also fluctuated, but granular or floccose precipitation in broth cultures was usually associated with avirulence. Haemolysis gave two main groups. In dye bacteriostasis, culture tests with crystal violet showed that avian strains were usually more resistant.

The authors determined two main groups of the organisms, by cultural, biochemical, serological and pathogenicity tests. The first group consisted of typical non-haemolytic strains, divisible into two sub-groups and a third rather indistinct sub-group by fermentation tests in xylose, arabinose and dulcitol and by agglutination reactions. However, repetition of these tests over a period of two years showed that complete variation from one set of group reactions to another did occur with some strains. The second group contained atypical haemolytic strains [*Past. haemolytica*, described by Newsom and Cross—(1932). *J. Amer. vet. med. Ass.* **80.** 711].

Two types of variability are described. Permanent variants included rough and mucoid forms. Temporary variants, eight of which are described, suggested cyclic changes which might account for the conflicting results of many previous investigators.

The species classification is discounted and the name *Pasteurella multocida* Kitt 1885 *n. comb.* is suggested for all typical non-haemolytic strains.—C. V. W.

BRUHL, L. (1938). Les pasteurelloses en pathologie comparée ; l'infection pasteurellaire chez l'homme. [**Pasteurellosis in Comparative Pathology ; Pasteurella Infection in Man**].—*Rev. Path. comp.* **38.** 1235-1267. [Numerous refs.]

The bacteriology of the group is discussed. A brief historical note is given on pasteurellosis in animals. Unfavourable hygienic and climatic conditions predispose to infection. The various types of the disease are mentioned.

The organism also plays an important role as a " microbe de sortie ". The chronic infection is rare in man.—F. H. MANLEY.

POSTMA, C. (1938). Kan bac. tularense den mens per os infecteren ? [**Possibility of Peroral Infection in Man with Tularaemia**].—*Tijdschr. Diergeneesk.* **65.** 213-216.

After a study of the literature on the subject, P. came to the conclusion that peroral infection with tularaemia occurs in man.—JAC. JANSEN (UTRECHT).

ROSATI, T. (1938). Il paratifo dei bovini in Sicilia. [**Bovine Paratyphoid in Sicily**].—*Azione vet.* **7.** 342-352. 2 figs., 4 tables. [Numerous refs.]

Several outbreaks of bovine paratyphoid are described, mainly occurring in herds kept in poor hygienic conditions. The organisms found were typed as *Salmonella enteritidis* var. *dublin* and *S.e.* var. *rostock*. The infection was found in old as well as in young cattle and was often associated with purulent arthritis. About 148 animals were infected of which about 34 died, and the rest recovered after treatment with serum and vaccine.

EDWARDS, P. R., & BRUNER, D. W. (1938). **Two New *Salmonella* Types Isolated from Fowls.**—*J. Hyg., Camb.* **38.** 716-720. 2 tables. [10 refs.]

Two new salmonella types are described, *S. minnesota* and *S. worthington*. The former was isolated from a three-weeks-old poult and the latter from a young turkey and a chick. They do not appear to be identical with any other strains previously described. The cultural characteristics, carbohydrate reactions and antigenic formulae are given. [No information is given as to the relationship of these organisms to disease in the birds from which they were isolated].—H. N. S.

JUNGHERR, E., & CLANCY, C. F. (1939). **Serologic Types of Salmonella Isolated from Paratyphoid in Chicks.**—*J. infect. Dis.* **64.** 1-17. 2 tables. [Numerous refs.]

In a routine examination of 1,241 chicks under 3 weeks old, the authors found 15 cases of infection with the paratyphoid bacteria mentioned below. Ten of these were from pullorum-free stock. Of the 14 strains studied serologically four were classified as *Salmonella typhi-murium* according to the Kauffman-White scheme. Two were classified as *S. typhi-murium* var. *binns*, one as *S. bareilly*, two as *S. oranienburg*, three as *S. montevideo*, one as *S. anatum*, and one as *S. london*. So far as the authors are aware *S. bareilly*, *S. montevideo* and *S. london* have not been recorded before as occurring in man or animals in the U.S.A. Analysis of the antigenic structure of *S. montevideo* confirmed its inclusion in the vi, vii group, and that it is monophasic. The specific phase was found to contain m t g o s, of which g o s was deficient in absorbing capacity.—A. A. B. ELLIS.

BOYCOTT, J., & MCNEE, J. W. (1936). **Human Infection with the American Hog-Cholera Bacillus. A Third Example in England.**—*Lancet.* **231.** 741-742. [Numerous refs.]

A fatal infection in a woman with *Salmonella cholerae-suis* is described. The source of the infection was not established.

STANDFUSS, R., & KOCH, R. (1937). Untersuchungen über die Brauchbarkeit der von Hohn und Hermann empfohlenen Hottinger-Stierhodenbouillon sowie der Ammon-Nährboden für die Unterschiedung und Einteilung der Keime der Paratyphus-Enteritis-Gruppe. **[The Value of Different Media for the Differentiation of the Paratyphoid Group]**.—*Z. InfektKr. Haustiere.* **52.** 35-43. [8 refs.]

The authors advocate the use of bovine testicle broth and Simmons' ammonium medium for the growth and identification of salmonella. The latter medium consists of agar to which is added a mixture of sodium-ammonium phosphate 0·15%, potassium phosphate 0·1%, and $MgSO_4$ 0·02%, fermentable substances as eventually required, and bromthymol blue 1·5%.—E. J. PULLINGER.

FITCH, C. P., & DODGE, Ruth E. (1939). **Horses as Possible Means of Spread of Bang's Disease among Cattle.**—*Cornell Vet.* **29.** 29-31. 1 table.

Conditions were studied on eighty *Brucella abortus* infected farms. The first group of 40 farms had 29·2% reactors among 1,055 bovines; at least one horse on each farm had an agglutination titre of 1:250 or higher. In the second group of the remaining 40 farms, 17·1% of 791 cattle reacted on test; the serum of the horses on these farms was negative at 1:25. At the end of the period of testing reported on, the herds were roughly the same in size, but infection in the first group was 3·7%, while in the second group it was only 0·5%. The authors suggest that this evidence is an indication that the disease is transmitted from horses to cattle, and that infected horses which are allowed to remain on a farm are a potential hazard.—J. A. GRIFFITHS.

ANON. (1938). Plan de lutte contre les brucelloses. Avortement epizootique. Fièvre ondulante humaine). **[Control of Brucellosis in Man and Animals].** —*Arch. internat. Brucelloses.* **1.** 180-185.

It is recommended that public notices should be issued in the department of Ardèche offering a bonus for first notifications of abortions in goats, sheep or cattle. On receipt of notifications at the central office (the municipal authority of each village), practising physicians of the district would be warned and invited to report all suspected cases of undulant fever to the "authorized centre" and forward material for laboratory examination. These arrangements should also be adopted in neighbouring departments.—S. J. GILBERT.

KARSTEN. (1937). Ueber die bei der Bekämpfung des Abortus-Bang gemachten Erfahrungen. **[Experience in Control of Bovine Brucellosis]**.—*Dtsch. tierärztl. Wschr.* **45.** 639-641.

In the course of a general discussion on the question of the control of bovine contagious abortion by segregation based on blood tests, K. describes the results obtained to date in the voluntary scheme which was begun in Hanover about four years ago. In July, 1937, the scheme included 4,126 herds, comprising 30,984 cattle. Of these, 583 herds had passed four successive tests, 1,777 herds, three, and 2,168 herds, two, whilst 2,346 herds had passed one test. 397 herds had already been registered as abortion-free, and cattle from these are specially marked in sale catalogues. Whole districts are being attacked. No special difficulty has been found in keeping herds free, provided that no adult females are introduced except from clean herds, that no adult females are allowed on common pastures, that reactors are removed, and that the prescribed regulations are carried out. Herds with 10-15% reactors are usually dealt with fairly easily, but greater difficulty was experienced in the case of herds with higher percentages of infected animals,

particularly where separate premises were not available. K. supports the view that in badly infected herds, more use might be made of attempts to rear a new, clean herd from young animals.

For diagnosis Meinicke's reaction is regarded as equal to or slightly more sensitive than the agglutination or complement-fixation reaction. Calf vaccination is not regarded with favour, K. taking the view that further evidence is needed that it does not lead to infection and/or reactions.

In conclusion, K. states emphatically that eradication on the basis of blood tests is the way in which the disease should be dealt with.—A. W. STABLEFORTH.

SEELEMANN, M., WOLF, C. H., & PFEFFER, A. (1938). Versuche einer Beeinflussung der Abortus-Bang Infektion mit Hilfe von Serobortan und D-Vakzine. **[Attempts to Treat Contagious Abortion with "Serobortan" and D-Vaccine].** —*Tierärztl. Rdsch.* **44.** 615-620. [12 refs.]

In two brucella infected herds 50 cows and 5 bulls positive to the blood and flocculation tests, and 28 non-reacting cows and 17 non-reacting bulls were inoculated with a substance named " serobortan " together with a vaccine. The former substance is described as a protein-lipoid mixture containing chemical elements. 74 uninoculated non-reacting animals (52 cows and 22 bulls) were kept as controls. During the year the experiment continued. 5 of the 52 untreated negative cows developed titres over 1:50, while all the 28 negative cows treated remained negative. Of the uninoculated non-reacting bulls 18 became positive and 21 remained negative. The blood titres of the original positive reactors did not fall appreciably after vaccination, and abortion was not prevented.—P. S. WATTS.

I. BELL, F. N., & IRWIN, M. R. (1938). **Studies on the Variation of the Blood Cells of Cattle in Health and During Brucella Infections.**—*J. infect. Dis.* **63.** 251-262. 6 figs., 2 tables. [5 refs.]

II. IRWIN, M. R., & BELL, F. N. (1938). **The Interrelationships of the Blood Cells of Cattle in Health and During Brucella Infections.**—*Ibid.* 263-268. 1 table. [3 refs.]

I. Total red and white cell counts as well as differential counts were made at irregular intervals in a herd of 35 animals, including 14 which were " ceased reactors " from a previous infection. On the ninth day after artificial exposure to infection, weekly counts were made in 22 of these animals, including 11 " ceased reactors ", over a period of 7-8 months. Both resistant and susceptible groups (*i.e.* whether producing calves at full term, or aborting) showed a significant decrease in the total red and white cell counts after infection. A definite increase in the average percentage of polymorphonuclear leucocytes followed infection in both groups. An increase in the average percentage of monocytes was noted, slight and not significant in the resistant group, but very marked in the susceptible group. The average percentage of lymphocytes at all times was in almost direct inverse proportion to that of the polymorphonuclear leucocytes.

Blood from 13 reactors from another herd was examined weekly for 10 weeks ; in these animals there was a marked increase in the percentage of monocytes.

II. Analysis of the interrelations of the various blood cell types for each group, described in the preceding paper, showed that the total white cell count was positively, but not always significantly, correlated with the total red cell count. In infected cows, there was an appreciable association of the total white cell count with the percentage of monocytes, but this was not observed in normal animals. In the infected animals, the proportion of monocytes was negatively associated with the percentage of eosinophiles and in the susceptible group with that of the polymorphs.—R. O. MUIR.

ARIEL, M. (1937). K patologičeskoj morfologii brucelleza u abortirovannykh plodov ovec. **[On the Morbid Anatomy of the Aborted Sheep Foetus in Cases of Brucella Infection].**—*Brucellosis in Sheep.* pp. 151-155. 2 figs., 1 table. [3 refs.] Moscow : Viem Publ. Dept.

Autopsy of the foetuses of 22 ewes which had aborted from naturally acquired brucellosis on the Experimental Sheep Farm in North Caucasus, revealed acute inflammatory lesions in the umbilical cord. Foetuses from normal ewes were not examined, however, so there was no comparison with healthy animals. The most outstanding morphological changes in the aborted foetuses were found in the liver in the form of numerous necrotic foci, or of a diffuse interstitial hepatitis ; in the latter case the liver cells were compressed by the elements of the granulating tissue, and gradually became atrophied. Wide-spread necrotic foci were sometimes found also in the cortical layer of the adrenal glands, but in the majority of cases the cortical layer contained focal accumulations of polyblasts and polymorphonuclear leucocytes ; in such nodules there were necrotic areas. In many foetuses sharply defined inflammatory changes were found in the connective tissue surrounding the lymph nodes. In the lymph nodes a generalized hyperplasia of the reticulo-endothelial elements was commonly observed, similar to that found by A. in the lymph nodes of ewes which aborted from natural or experimental brucellosis. Sometimes a condition of generalized broncho-pneumonia was observed in the foetuses, apparently due to the aspiration during parturition of the amniotic fluid and of vaginal secretions of the mother. There was marked hyperaemia of the spleen pulp. Nothing characteristic was observed in the heart or kidneys.

DERVILLEZ. (1938). Les brucelloses peuvent-elles déterminer l'avortement chez la chienne ? **[Brucella as a Possible Cause of Abortion in Dogs].**—*Rev. Path. comp.* **38.** 790-792.

D. speculates as to the causes of abortion in six bitches, and wonders whether it may have been due to brucella infection. He produces no evidence.—C. V. W.

PRIESTLEY, F. W., & MCEWEN, A. D. (1938). **The Toxicity of** *Br. abortus* **for Mice.**—*J. comp. Path.* **51.** 282-289. 9 tables. [11 refs.]

Br.a. inoculated intraperitoneally or intravenously in suitable doses into mice has a toxic action and usually results in death within four days. This does not occur after subcutaneous inoculation.

If non-virulent strains are used, larger doses are required to produce death. The toxic effects are neutralized by immune serum, and a smooth antiserum protects against smooth but not against rough strains. The experiments indicate that the toxicity is proportional to virulence and is not related to smoothness or roughness. It is suggested that mouse inoculation might prove a rapid method of estimating virulence, although it is not a more sensitive test than can be performed with g. pigs. The authors discuss the cause of the toxicity and its relation to virulence.—S. J. GILBERT.

MAZZARACCHIO, V. (1937). La brucellosi. Infezione professionale dei veterinari. **[Brucella Infection in Veterinarians].**—*Azione vet.* **6.** 863-869. 1 fig., 4 tables.

This is a general description of the research that has been done on brucellosis by different workers, and also a discussion of the infection in man, which is mainly a repetition of the articles by A. THOMSEN [*V. B.* **8.** 207 and 582].

WOLTER, F. (1937). Zur Frage der Aetiologie und Prophylaxe der Bangschen Krankheit. [**Aetiology and Prevention of Human** *Brucella abortus* **Infection**]. —*Berl. tierärztl. Wschr.* Sept. 3rd. 549-551.

W. first discusses two cases of undulant fever in man, of which one occurred coincidently with a fatal infection believed to be due to brucella (titre 1:3000) in a bitch, and the other following a bite by a dog with a titre of 1:4000. He also records agglutination tests made on the personnel on a large estate where a typical case of U.F. had occurred. Seventeen individuals who had " no contact " with infected animals all gave negative results. Of 67 who had no contact with infected animals but drank their milk raw, 4 showed " evidence of latent infection ", whilst of 22 individuals who had worked with aborting animals, 7 " gave a positive result ". W. also discusses at some length his idea that infection is acquired by the respiratory route, apparently associated in some way with ground and climatic conditions, and not by contact or ingestion.—A. W. STABLEFORTH.

ANON. (1938). Die in den Jahren 1936 und 1937 bekanntgewordenen Erkrankungen bei Menschen infolge Infektion mit Brucella abortus Bang. [**Statistics of Known Cases of Human** *Br.a.* **Infection in Germany in 1936 and 1937**]. —*Reichsgesundheitsblatt.* **13.** 908-909. 4 tables.

Statistical data are presented showing that the number of cases of human infection with *Br.a.* treated in hospitals in Germany was slightly greater in 1936 and 1937 (587 and 586 respectively) than during the five preceding years. The majority (425 and 395 respectively) occurred in Prussia, with a marked predominance among agricultural workers. Raw milk and dairy produce appeared to have been somewhat more frequently the source of infection in 1937 than in 1936. In the two years *Br.a.* infection resulted in the death of three women, one 18-month-old boy, and three men. *Br.a.* was successfully cultured from the blood of patients 44 times in 1936, and 39 times in 1937.

D'AGATA, A. (1938). Sui metodi di differenziazione dei tipi del genere "Brucella", con speciale riguardo a quello recentemente proposto da Izar e Famulari. [**Comparison of Methods for Differentiation of Brucella**].—*G. Batt. Immun.* **20.** 64-77. 1 table. [16 refs.] [English, French and German summaries].

Izar and Famulari's method of differentiating the three types of brucella [*V. B.* **9.** 300.] proved valueless when used by the author, who also came to the conclusion that Petragnani's medium with thionin is inferior to that recommended by Meyer and Zobell [*V. B.* **3.** 466].—A. J. CASSAR.

STEUER, W., & VON BOCK, K. (1938). Zur Frage der kulturellen Typendifferenzierung in der Gruppe " Brucella ". [**Cultural Differentiation of the Brucella Group**].—*Klin. Wschr.* **17.** 158-159. 1 table. [6 refs.]

Izar and Famulari's method of typing members of the *Brucella* genus according to their resistance to lactic acid [*V. B.* **9.** 300.] could not be confirmed. On the other hand, the methods of typing on Petragnani's medium, and Schwarzmaier's method [*V. B.* **7.** 321.] were found of considerable value.—E. J. PULLINGER.

SEREN, E. (1937). Sull'inoculazione della Br. abortus bovis e della Br. melitensis nella cavia per via endotesticolare a scopo differenziale. [**Attempt to Differentiate** *Br.a.* **and** *Br.m.* **by Intratesticular Inoculation of Guinea Pigs**].—*Nuova Vet.* **15.** 133-137. 3 tables.

Three series of experiments were carried out to differentiate *Br.a.* from *Br.m.*

by means of intratesticular inoculation of g. pigs, but the clinical symptoms and histopathological lesions observed did not furnish constant and reliable results.
—A. J. CASSAR.

WATTS, P. S. (1938). **Note on the Isolation of *Cl. tetani* from the Intestines of Normal Sheep in Cambridgeshire.**—*Brit. J. exp. Path.* **19.** 422-424. [7 refs.]

Cl. tetani was found in the intestines of 5 out of 32 sheep examined. YOUNG [(1927). *Brit. J. exp. Path.* **8.** 226.] had found that Cambridgeshire and district showed a high infection rate for tetanus in man. The author wished to ascertain if this organism could be found in a large number of sheep in the district. The percentage of sheep found to be harbouring *Cl. tetani* was no higher than that recorded elsewhere.—A. A. B. ELLIS.

LOVE, W. G., MILLAR, J. A. S., & RAWLINGS, W. B. (1938). **Gas Gangrene (Clostridium Welchii, B. Perfringens) Infection in the Dog.**—*N. Amer. Vet.* **19.** No. 11. 51-60. [Numerous refs.]

An account of the isolation of *Cl.w.* from a gas gangrene lesion in a dog.
—D. D. OGILVIE.

FENSTERMACHER, R., & POMEROY, B. S. (1939). **Clostridium Infection in Turkeys.**—*Cornell Vet.* **29.** 25-28. [7 refs.]

Anaerobes were isolated from two turkeys out of a flock in which there had been a mortality rate of about 2% for 4-5 years. The losses were in hens and had occurred at the beginning of the breeding season. A suspension prepared from the livers and spleens of the two birds was injected into two turkeys, six g. pigs and two rabbits. The two turkeys and two of the g. pigs died in 48 hours; in the remaining animals there was swelling at the site of inoculation, but all recovered.

Cl. welchii, *Cl. septique*, and *Cl. sordellii* were cultivated from the livers of a naturally infected turkey, one of the artificially infected turkeys and one of the artificially infected g. pigs.—W. J. IRONSIDE.

DALLING, T., & ROSS, H. E. (1938). **Clostridium welchii: Notes on the Relationship Between the Types of Cultures and the Production of Toxin.**—*J. comp. Path.* **51.** 235-249. 1 table. [Numerous refs.]

Using sera in which the proportions of the antibodies to the various toxins of the *Cl.w.* group were known, the authors employed the haemolytic tests for α and β toxins and the mouse intravenous test for β and ϵ toxins, in assessing the potency of the toxins produced by this group under various conditions. For the production of α toxin a meat broth medium containing 50% of minced meat was the most successful, while only 10% of meat was to be preferred for β or ϵ toxins. Each of these is best harvested after a short period of rapid growth. The ϵ toxin was produced in highest concentration after four to five days incubation in a medium containing 50% of meat. The addition of glucose or trypsin, the period of incubation, the pH and the volume of medium affected the relative proportions of each type of toxin in cultures yielding more than one type. From lambs dying of enterotoxaemia types B and D were isolated. The D type occurred in the stomach and duodenum and the B type in the ileum.—P. S. WATTS.

I. WALBUM, L. E. (1938). **The Importance of Hydrogen Ion Concentration in Haemolysis by the Lysins of Anaerobic Bacteria.**—*J. Path. Bact.* **46.** 85-93. 4 tables, 5 charts. [4 refs.]

II. KLIGLER, I. J., & GUGGENHEIM, K. (1938). **The Influence of Vitamin C on the Growth of Anaerobes in the Presence of Air, with Special Reference to the Relative Significance of EH and O_2 in the Growth of Anaerobes.**—*J. Bact.* **35.** 141-156. 2 figs., 9 tables. [Numerous refs.]

I. Broadly speaking these haemolysins are of two types; in type A there is an optimal pH point, with decreasing haemolysis on both sides of this pH; in type B there is a pH point coinciding with minimal haemolysis with increasing haemolysis on both sides of this pH. In some cases the haemolytic process may be due to a combination of these two types, *i.e.*, with maximal and minimal points of haemolysis.

The technique used is briefly described. Two series of experiments were devised, one in which homologous serum was the buffer used and another with phosphate as the buffer. When serum was used as the buffer the effect of pH on the lysin of *Clostridium welchii*, *Cl. oedematiens* and *Cl. tetani* was uniform, *i.e.*, haemolysis diminished with increasing pH; whereas *Cl. septique* however was found to belong to the B type of haemolysins (minimal activity at about pH 6·8 with increasing activity on both sides of this). When phosphate was used as the buffer no change was seen in the process so far as *Cl.o.* and *Cl.t.* were concerned, but a marked change was seen in the case of *Cl.w.* (causal organism of lamb dysentery) and *Cl.s.*, which both behaved as type A with a point of maximal activity at pH 7·2-7·3 with decreasing activity on both sides of this. The effect of variation of pH on the stability of the lysins was determined and also their respective points of greatest stability. In a number of cases the pH of greatest stability did not coincide with the pH required for maximal haemolysis.

II. The work done upon this subject is discussed. The preparation of the medium used is given. Vitamin C was added in varying proportions. No growth of *Cl.w.* occurred under aerobic conditions where the concentration of vitamin C was less than 0·02% and amounts greater than 0·02% did not influence the growth. The addition of glucose to the medium made no difference to the minimum quantity of ascorbic acid required for growth; above this minimum glucose acted as a nutrient and enhanced the growth. On the addition of peptone to the medium a smaller amount of vitamin C was required, and also growth was intensified. Thus peptone had a double action, in that it produced reducing agents and also acted as a nutrient.

The vitamin C used up in the media was estimated; it was found that loss was greater in the un-inoculated tubes than in the inoculated ones. The total quantity of vitamin C lost was found to be the same with concentrations used. The presence of glucose in the media made no difference to the rate of loss, but peptone acted as a protective: that is, the more peptone present the less ascorbic acid lost.

The intensity of oxygen reduction potential paralleled the increasing concentration of vitamin C. Glucose did not influence the reduction; peptone exerted a reducing effect.

Growth occurred in tubes in which the oxygen tension was equal to 95% of the normal, provided that an adequate amount of vitamin C was present. Vitamin C lowered the oxygen potential, but did not appreciably affect the oxygen tension. The reduction potential at which growth occurred was −0·125V.—L. E. HUGHES.

MOSER, F. (1937). Untersuchungen über die Einwirkung von Rindergalle auf einige Bakterien- und Virusarten. [**The Action Of Ox-Bile on Bacteria and Viruses**].—*Zbl. Bakt. I. (Orig.).* **140.** *180-*183.

This paper deals with studies in the attenuation and final destruction of certain bacteria and viruses by ox-bile. The virus of fowl plague was inactivated

after 48-72 hours by raw ox-bile, whilst sterilized bile killed the virus after 24 hours. Similar results were obtained with the virus of swine fever; organisms of the haemorrhagic septicaemia group in bile were killed within 24 hours when kept in a refrigerator. M. does not give the results of his tests on the viability of salmonella in ox-bile. He merely states his disagreement with the opinion of others [no reference] that ox-bile is lethal for salmonella. The pH of the bile plays a certain part in the destruction of bacteria.—M. F. BENJAMIN.

BALDACCI, E. (1937). Contributo alla sistematica degli Attinomyceti. I. Sull' Actinomyces bovis Harz e sull'Actinomyces sulphureus Gasp. [**A Contribution to the Systematic Classification of the Actinomycetes. I.** *A.b.* **Harz and** *A.s.* **Gasp**].—*Atti Ist. bot. Univ. Pavia.* **9.** 243-271. 2 figs. [Numerous refs.] [English and Latin summaries].

B. discusses the nomenclature of *A.b.* [see, however, M'FADYEAN, *V. B.* **4.** 19]. In 1894, GASPERINI pointed out that the name *A.b.* could not be applied generally to all the organisms isolated from lesions in cattle, and suggested that it should be abandoned. He divided the organisms into four groups, the chief, in his classification, being *A.s.*

B. undertook a revision of the whole position, beginning with *A.s.* since it resembles as closely as any the organism originally described by HARZ. Eight strains were obtained from various laboratories and their cultural and morphological characteristics were compared. The majority of the strains were labelled *A.b.*

All the strains, with the exception of two, grew readily on Pollacci's medium (pH 6·7) at 25°C., and after seven days' incubation developed dew-drop colonies which later coalesced forming a delicate network over the surface of the medium; vegetative filaments did not appear constantly. All the strains, with one exception, formed circular colonies on potato. These became covered with sulphur yellow vegetative filaments which developed slowly but abundantly. All the strains grew on serum agar and grew in and liquefied gelatine, and converted starch to dextrin. Only one strain could be induced to grow under anaerobic conditions.

The morphology of all the strains was similar, the organisms appearing as fine, branching filaments less than 1μ in thickness from which there developed erect spiral vegetative filaments, yellowish brown in colour and exceeding 1μ in thickness. These bore yellow arthrospores more than 2μ in circumference. On solid media, thick, diffuse colonies adhering to the substrate developed, changing in colour from yellow to black, and were often, though not always, covered with sulphur-yellow vegetative filaments.

B. holds that these results indicate *A.s.* and *A.b.* to be identical, and that since GASPERINI was the first to describe the organism accurately, his name for it should replace all others.—J. A. NICHOLSON.

STEWART, R. A., & MEYER, K. F. (1938). **Studies in the Metabolism of Coccidioides immitis (Stiles).**—*J. infect. Dis.* **63.** 196-205. 4 tables, 2 graphs. [Numerous refs.]

A study of the metabolism of *C.i.* was undertaken in order to develop a synthetic medium with selective properties. The nitrogenous metabolism and glucose assimilation were studied in the double strength veal infusion broth of van Ermengen and it was found that ammonia increased in all cultures. The presence of glucose had a protein-sparing action in that protein hydrolysis was slowed, but the production of ammonia was not affected. Fatty acids diminished in the presence of glucose as well as in its absence. Although glucose was assimilated, the pH of

the medium tended to rise, and in studying this phenomenon it was found that changes in the pH occurred independently of glucose consumption and are to be explained by variation in the consumption of other constituents. In the construction of a synthetic medium it was found that ammonium salts were a suitable source of nitrogen, and that acetic acid would supply the carbon. A medium used for isolation of *C.i.* from soil consisted of ammonium chloride and sodium acetate. The medium had selective properties but was not specific as other moulds grew sparingly in it. When used for the isolation of the organism from clinical material about 100 c.c. of medium should be inoculated in order not to introduce a large percentage of added nutrients.—U. F. RICHARDSON.

DISEASES CAUSED BY PROTOZOAN PARASITES

BISHOP, Ann. (1938). *Histomonas meleagridis* **in Domestic Fowls** (*Gallus gallus*). **Cultivation and Experimental Infection.**—*Parasitology.* **30.** 181-194. 20 figs. on 2 plates, 1 table. [Numerous refs.]

Turkeys bred from " sterilized " eggs were fed with bacteria-free cultures of *H.m.* in order to establish that this organism is the cause of " blackhead ". Although cultures (Strain CL) were obtained from the liver of a hen and subcultured for a year, B. failed to obtain a pure culture. The media used are described. The pH of cultures less than three days old was 7·0-6·5, but fell later. If it was less than 4·0 all the organisms died. The optimum temperature was 36·5°-37°C. ; the organisms died rapidly at room temperature or lower temperatures. Strain CL was not markedly virulent for chicks, but infectivity was high, 11 out of 12 chickens being infected, although only caecal lesions were set up. The strain showed great amoeboid activity at 37°C., and normally possessed a hair-like flagellum. In fixed stained preparations the size was 8-19μ (average 10-14μ) ; living forms were larger. The nucleus was spherical or pear-shaped, with a well-defined nuclear membrane and a globular, siderophilic karyosome. A flagellum arose from a single blepharoplast, which was sometimes apposed to the nuclear membrane and otherwise attached to it by two fine rhizoplasts. An extra fibril arising from the blepharoplast and ending in the cytoplasm at the opposite end of the body was sometimes seen. Multiple fibrils as described by TYZZER [(1919). *J. med. Res.* **40.** 1.] in tissue sections were not seen. Parasites having 2-4 nuclei, each of the latter with a flagellum, are described ; the flagella disappeared during division. No resistant phase was observed in cultures.—C. V. WATKINS.

NIIMI, D. (1938). **Studies on Blackhead. III. Test of Surgical Operation, Immunology and Chemotherapy.**—*J. Jap. Soc. vet. Sci.* **17.** 18-57 of pt. 1. 14 tables. [4 refs.] [In Japanese : abst. from English summary pp. 3-5 of pt. 2]. [See also *V. B.* **9.** 156].

N. found that eradication of *Heterakis papillosa* controlled blackhead. He now considers other curative and preventative measures of control. Ligature of the caeca at their base [see also *V. B.* **4.** 342.] prevented infection, but this stunted the growth of chicks and in addition often proved fatal.

N. deduced from field observations that a " sterile " immunity resulted after recovery from the natural disease. On rare occasions recovered birds became reinfested after an interval of 50-60 days. Artificial immunity could be induced by intracloacal injection of the parasites or by subcutaneous injection of free-living liver parasites. Such immunization was neither very safe nor efficient. Serum from recovered birds could not be proved to contain antibodies.

Many drugs used for various protozoan diseases were tested by broth culture for prophylactic purposes. Trypaflavine, "livernol", trypanblue, "bistran", "neo-Trepol", chinine, "plasmodin", atebrin, "Yatren 105", and Bayer 205 all had no effect. Sodium tartar emetic and ipecacuanha had a slight effect on lesions but not on the course of the disease or mortality. Results were better when both these preparations were used.—C. V. WATKINS.

PAVLOV, P., & GUENEV, C. (1939). Recherches sur un trypanosome (*Trypanosoma evansi* Steel 1885) trouvé dans le sang d'un cheval de la région du Bourgas en Bulgarie. [*Tryp. evansi* **in the Blood of a Horse in Bulgaria**]. —*Ann. Parasit. hum. comp.* **17.** 158-161. 2 figs. [16 refs.]

A trypanosome is described from the blood of a 16-year-old horse in Bulgaria which had not been out of the country. It is considered that the organism was *Tryp. evansi* and not *Tryp. equiperdum*, as it was inoculable to a mare with dourine, and also to cattle, sheep, dogs, cats, rabbits and g. pigs. The organism is described as occurring in two forms, one long and slender with a free flagellum, and devoid of a blepharoplast, the other short with no free flagellum. It is thought this discovery may be important as *Tryp. evansi* may be capable of spreading in Europe. [The dimorphism described is not characteristic of *Tryp. evansi*, though that organism has a greater variation than *Tryp. equiperdum*].—U. F. RICHARDSON.

I. TOPACIO, T., & ACEVEDO, R. A. (1938). **A Survey of the Incidence of Surra in Philippine Cattle and Carabaos by Complement Fixation Test. (Preliminary Report).**—*Philipp. J. anim. Indust.* **5.** 597-604. 2 tables, 1 graph. [3 refs.]

II. TOPACIO, T. (1938). **Studies on Surra. I. The F-N-T.E. [Fouadin-Naganol-Tartar Emetic] Treatment of Native Horses in Experimental Infection. II. The F-N-T.E. Treatment of Native Horses in Natural Infection.**—*Ibid.* 605-610.

II. YUTUC, L. M. (1938). **A Report on the First Outbreak of Surra in British North Borneo and Its Control Measure.**—*Ibid.* 501-515. 4 figs. on 3 plates, 4 tables, 1 map. [4 refs.]

I. It has been shown by the complement-fixation tests carried out that domesticated water buffaloes are more frequently carriers of *Trypanosoma evansi* infection than cattle. The incidence of infection in 2,624 buffaloes was 19·3%, while of 2,141 cattle only 2·57% were infected. There is no apparent seasonal fluctuation in the infection of either species; illness due to infection occurred in every month of the year. The extension of this survey to cover all the islands by means of the c.-f. test is being continued.

II. T. gives the results of treating (a) 11 experimentally infected and (b) 50 naturally infected native ponies (of 300-500 lbs weight). Six of the first group recovered and 44 of the second group. Six injections at intervals of 5-7 days were given. The first dose consisted of 40 c.c. fouadin injected subcutaneously and 2 g. of a 2% naganol solution intravenously; the second dose was 1 g. of a 1% solution of tartar emetic intravenously; the third dose was 2 g. naganol, the fourth was 1 g. tartar emetic, the fifth 2 g. naganol, and the sixth 1 g. tartar emetic. Fouadin may replace the tartar emetic in any of the doses; this was done with pregnant mares. Subcutaneous injections of camphor in oil were used as a cardiac stimulant when necessary. Tests for a cure included the results of blood inoculation of susceptible small animals, microscopical blood examination, three successive complement-fixation tests at monthly intervals, tests of spinal fluid by animal inoculation, and c.f. tests.

III. Y. reports on an outbreak of *Tryp. evansi* infection which he investigated. He found that 120 of 973 ponies and one of 658 buffaloes were infected ; 85 cattle and 5 goats were not infected. He treated the infected animals with 20-30 c.c. of a 10% solution of naganol followed the next day by 50 c.c. of a 2% solution of antimony tartrate. The results are not recorded.—J. A. GRIFFITHS.

CORSON, J. F. (1938). **A Fourth Note on the Infectivity to Man of a Strain of** *Trypanosoma rhodesiense*.—*J. trop. Med.* (*Hyg.*). **41.** 262-265. 3 tables. [9 refs.]

C. records further experiments on man to test the infectivity of a strain of *Tryp. rhodesiense* which had been maintained in ruminant animals (sheep and antelopes) since October 1934 by cyclical passages through *Glossina morsitans* [see *V. B.* **4.** 234]. Strains from sheep, a reedbuck and an eland were successfully transmitted to man by infected *G.m.* The pathogenicity of the sheep strain to man appeared to be about the same as when tested two years previously. C. concludes that *Tryp. rhodesiense* is a parasite not only of man but also of wild and domestic animals and that it may retain its infectivity for man for several years, or perhaps indefinitely, while living only in animals and tsetse flies. Only one of 30 men infected in the above experiments had failed to show a local swelling where the *G.m.* had fed. C. states that this local swelling, with associated axillary pain, was almost always a definite sign of infection. Trypanosomes appeared in blood from the swelling sometimes two or three days earlier than in blood from the ear lobe. —J. A. GRIFFITHS.

CORSON, J. F. (1938). **A Third Note on a Strain of** *Trypanosoma gambiense* **Transmitted by** *Glossina morsitans*.—*Ann. trop. Med. Parasit.* **32.** 245-248. 2 tables. [2 refs.] [See also *V. B.* **9.** 234].

Observations are recorded on a strain of *Tryp. gambiense* after three further passages through *G.m.* There was no evidence that its characters became in any way modified in the direction of *Tryp. rhodesiense.* In the course of direct transmission, a strain isolated from one rat showed increased virulence for rats and g. pigs but not for monkeys. This strain also became less polymorphic, nearly all trypanosomes being slender with a rather short free flagellum.—U. F. R.

KOLODNY, M. H. (1939). **Studies on Age Resistance against Trypanosome Infections : I. The Resistance of Rats of Different Ages to Infection with Trypanosoma cruzi.**—*Amer. J. Hyg.* Sect. C. **29.** 13-24. 4 tables. [Numerous refs.]

DUCA, C. J. (1939). **Studies on Age Resistance against Trypanosome Infections : II. The Resistance of Rats of Different Age Groups to** *Trypanosoma lewisi*, **and the Blood Response of Rats Infected with this Parasite.**—*Ibid.* 25-32. 1 fig., 3 tables. [12 refs.]

CULBERTSON, J. T., & KESSLER, W. R. (1939). **Studies on Age Resistance against Trypanosome Infections : III. Vaccination of Rats against** *Trypanosoma lewisi*, **with Special Reference to the Response of Different Age Groups.**—*Ibid.* 33-43. 3 tables. [Numerous refs.]

CULBERTSON, J. T. (1939). **Studies on Age Resistance against Trypanosome Infections. IV. The Activity of Germanin (Bayer 205) upon** *Trypanosoma equiperdum* **Infections in Rats of Different Age Groups.**—*Ibid.* 73-77. 2 tables. [12 refs.]

I. Rats less than 25 days old developed an intense and usually fatal infection when inoculated with 0·006 c.c. per g. body weight of infective suspension, containing 125-150 trypanosomes under high dry magnification (450 ×), whilst both

males and females of 40-50 days showed a marked resistance which reached its maximum at 75 days, did not decrease thereafter, and which was not related to the presence of any antibody or non-specific factor in the serum. This period closely parallels that of physiological maturation, and may be connected with endocrine function.

II. D. found that when rats of different age groups were injected with 10,000 *Tryp. lewisi* per g. body weight, those of 25 days and under frequently died, whilst those of from 25 days up to 6 months and over showed a marked resistance and mortality was rare. Examination of the blood of animals of both age groups revealed a low erythrocyte count and a secondary anaemia, which was probably a major factor in the cause of death of the very young rats ; those that survived showed a marked leucocytosis and an absolute monocytosis. Several monocytes exhibited phagocytosis, but no definite evidence of ingestion of a trypanosome was obtained.

III. Rats were protected against infection with *Tryp. lewisi* by the administration of a formolized homologous antigen. Resistance was more slowly developed in newly born and very young animals than in those 60 days old ; the latter group showed a higher agglutination titre after injection of the vaccine than the former, but this titre after recovery from natural infection was somewhat higher than after vaccination. The acquired resistance was maintained for at least three months after vaccination, and appeared to be independent of the leucocytic response.

IV. Rats of different ages were inoculated with a standard dose of *Tryp. equiperdum*, and when the infection had reached a certain level, 10 g. of germanin per 100 g. body weight was injected. In old rats the parasites disappeared from the blood within 15 hours, whilst in young rats they persisted for 30-60 hours. The difference was probably related to variation in the phagocytic capacities of the white cells of rats of the different age groups. Rats with a lighter infection overcame the parasites in less time than did those with a heavy infection. Blood of germanin-treated rats was not infective when injected into normal rats.—M. L. B.

ANDREWS, J., & MILLER, F. W. (1938). **Infection with** *Trichomonas foetus* **in Heifers.**—*Amer. J. Hyg.* **27.** 235-249. 1 fig., 1 table. [18 refs.]

The reproductive history was followed up and frequent parasitological examinations were made, on 40 heifers with reference to the effects of infection with *Tr.f.* The majority became infected at the first mating with an infective bull ; the duration of the infection varied. In most cases there was a decline in clinical severity and a decrease in the number of the parasites ; later there was sometimes a spontaneous cure, but a specific resistance appears to follow infection. Prolonged infections were associated with delayed conception, sterility, pyometritis, abortion, and still birth. Infected bulls served cows more successfully than heifers and fewer services were required per cow than per heifer.—M. L. BINGHAM.

I. MAASSEN, H. (1938). Der mikroskopische Nachweis der Rinder-Genital-Trichomonaden (Trichomonas genitalis bovis) unter Berücksichtigung der gebraüchlichsten Färbemethoden. [**Microscopic Demonstration of Bovine Trichomonads by Staining Methods**].—*Inaug. Diss., Giessen.* pp. 28. 4 figs. on 4 plates. [Numerous refs.]

II. SÄLZER, H. (1938). Infektionsversuche mit Geschlechtstrichomonaden des Rindes. [**Experimental Infection of Cattle with Genital Trichomonads**]. —*Inaug. Diss., Giessen.* pp. 43. [Numerous refs.]

I. The author studied various methods for the detection and morphological study of *Tr. foetus*. He concludes that, to detect the organism in pyometra

material, the examination of fresh unstained material is the most reliable method. The organisms can be readily detected if still moving, and even if they are dead, they can be recognized in unstained material if degeneration has not gone too far. Dark ground illumination gave no advantage over ordinary illumination. Various methods of staining were tried, but were all rather unreliable for detection of infection unless the trichomonads were very numerous, when occasional well stained specimens could be seen. In his hands the most satisfactory staining was given by Hees' method, in which infected material is diluted with buffered saline, allowed to dry, and then stained for 30 minutes with dilute Giemsa. This method of staining was useful for the study of morphology, but, as the material has to be diluted with saline, is unsuitable for detecting infection in material in which the organisms are scanty.

II. S. records investigations on the experimental infection of cattle with *Tr.f.* Before being put on experiment, animals were examined for infection by culture of the blood and of the preputial or vaginal secretion. In two cases animals which were believed to be virgin gave positive cultures both from the blood and from the secretions of the sexual organs.

Bulls were infected by injection of culture into the preputial sac, and in one case by service of an infected cow. Trichomonads were demonstrated by cultural methods in the preputial secretions and, in three cases out of six, in the blood, but in no animals were the parasites detectable by microscopic examination. Attempts to demonstrate transmission of infection to cows by coitus were negative, but in each case the experimental animal had shown a previous trichomonad infection. Cows infected by intravaginal injection of culture or pus from the uterus of cases developed a vaginal infection, detectable microscopically, in periods varying from one to 18 days, and in two cases a blood infection was demonstrated by culture.

Attempts to infect by intravenous inoculation resulted in a temporary blood infection which disappeared in a few days without extension to the sexual organs, and oral administration of cultures or infected material did not result in infection of either the sexual organs or the blood.—U. F. RICHARDSON.

JENSEN, B. H. (1938). Trichomonadeinfektion hos Kvaeget specielt med Henblik paa Lidelsens Betydning som steriliserende Faktor. [**Bovine Trichomoniasis and its Importance as a Cause of Sterility**].—*Maanedsskr. Dyrlaeg.* **50.** 225-239. [7 refs.]

Uterine material from a cow with pyometra caused by trichomoniasis was rubbed into the prepuce or vagina of five cows and one bull, and none became infected. Intraperitoneal inoculation of 3 c.c. of the same material into ten pregnant g. pigs caused infection and abortion in only one animal.

J. considers that the trichomonads were of low virulence and that such factors as nutritional deficiencies are important predisposing conditions.

—H. C. BENDIXEN (COPENHAGEN).

SCHOOP, G., & STOLZ, A. (1939). Trichomoniasis bei Rehen. [**Trichomoniasis in Roebuck**].—*Dtsch. tierärztl. Wschr.* **47.** 113-114. 1 fig.

A condition of sterility is described in roebuck in the forests round Kassel in which the does failed to give birth to young for as long as 7 or 8 years. Examination of the uteri of five animals revealed an enlargement of the organs with a thickening of the mucous membrane, and in some cases a muco-purulent secretion. Cultural methods revealed a trichomonad infection in four out of five cases, the organism being similar to the trichomonad of cattle, but slightly smaller.—U. F. R.

SIMITCH, T., & KOSTITCH, D. (1938). Présence de *Trichomonas canistomae* Hegner et Ratcliff chez les chiens de la Serbie du sud. Sa différenciation d'avec *Trichomonas elongata* Steinberg. [*T. canistomae* **in Dogs in Southern Serbia**].—*Ann. Parasit. hum. comp.* **16.** 33-35. [2 refs.]

T. canistomae was isolated from the saliva in 23 out of a group of 165 dogs. Three young dogs and three human beings could not be infected experimentally [no details], but three adult dogs were easily infected. It is differentiated from *T. elongata* (a parasite of human beings) on morphological and biological grounds and on the results of experimental cross-infection [no details].—M. L. BINGHAM.

CHRISTENSEN, J. F. (1938). **Species Differentiation in the Coccidia from the Domestic Sheep.**—*J. Parasit.* **24.** 453-467. 9 figs., 1 table. [10 refs.]

Of faecal samples taken at random, 96% contained oocysts, 62% being of two to four species and 34%, pure. The authors conclude that the examination of the oocyst in the faeces of sheep is adequate for species identification, especially of the unsporulated oocyst. The sporulation time is misleading in identification, unless conditions are carefully standardized. A minute description of the oocysts follows, with the method of preparation of samples.

The authors confirm BALOZET's view [*V. B.* **3.** 351.] that there are heretofore only five valid species of *Eimeria* of sheep, *viz* :– *E. parva*, *E. nina-kohl-yakimovi*, *E. faurei*, *E. arloingi* and *E. intricata* ; *E. galouzoi* being found within the morphological range of *E. parva* and *E. aemula* among the atypical capless oocysts of *E. arloingi*. Two new species, *E. pallida* and *E. granulosa* are described.—S. F. B.

DEEM, A. W., & THORP, F. J. (1939). **Variation in Numbers of Coccidia in Lambs During the Feeding Season.**—*Vet. Med.* **34.** 46-47. 1 table, 1 chart. [10 refs.]

Faecal examinations were carried out on three lots of lambs fed under good conditions. Each sample was a composite one obtained from 3-4 lambs and four such samples were examined on each occasion. The examinations were carried out at intervals of approximately one week, and the results showed that the numbers of coccidia rose during the first two weeks after the lambs had been brought into the "feedlots", remained stationary for about three weeks, and then declined.

—W. J. IRONSIDE.

MINNING, W. (1936). Zur Entstehung der Kokzidenknoten in der Leber von Kaninchen. [**Coccidial Nodules in the Liver of Rabbits**].—*Z. Parasitenk.* **9.** 61-72. 8 figs. [5 refs.]

M. describes the early stages of coccidiosis in rabbits. He states that the first histological changes occur in the anterior part of the liver, and in the vicinity of the smaller bile ducts and interlobular veins, where lymphocytes appear before the parasites. This is caused by the reaction of the tissue to the migration of the sporozoites. Even when the first few parasites appear, dilatation of the bile duct can be observed, caused by the increase of epithelial cells.

In the later stages of the infection the proliferation of connective tissues corresponds to the picture of interstitial hepatitis.

IVANIĆ, M. (1937). Parazitski razorački rad i mnozenje multiplom deobom (shizogonijom) jednoga Leucocytozoon-a (Leucocytozoon galli spec. nov.) u crvenim krvnim zrncima i unutrašnjim organima domaće kokoši (Gallus domesticus L.). [**On a New Leucocytozoon,** *L. galli*, *n. sp.*, **Its Parasitic Destructive Action, and its Multiplication by Schizogony in the Red Blood**

Corpuscles and Internal Organs of the Common Fowl].—*Arhiv Minist. Poljopriv., Belgrade.* **4.** No. 9. 3-45. 1 plate. [Numerous refs.] [German summary].

The author describes the life-cycle of a new pathogenic species of *Leucocytozoon* (*L. galli*), and gives details of its multiplication by schizogony in the red blood corpuscles and internal organs (especially in the spleen) of the common fowl. —B. Oswald (Križevci).

Toumanoff, C. (1939). Le paludisme des buffles peut-il fausser les indices oocystiques et sporozoitiques en Indochine ? [**Malaria of Buffaloes in Indochina and its Falsification of the Oocyst and Sporozoite Indices In Human Malaria Surveys**].—*Bull. Soc. path. exot.* **32.** 80-87. [11 refs.]

Replying to Brumpt's suggestions [*V. B.* **9.** 155.] that oocysts and sporozoites of malaria observed in *Anopholes minimus* appeared to be too immature to be derived from the reputed infective feed, and might be derived from buffaloes on which the insects had fed later, T. points out that it is known that development of malarial parasites in mosquitoes may be delayed by cold. He also points out that in one case the insect in question had been fed on cattle and not on buffaloes. He records other cases in which sporozoites and young sporocysts had been detected up to 17 days after the infecting feed, and also points out that *A. minimus* feeds almost entirely on human blood, whilst other species of mosquitoes which feed largely on buffaloes have not shown a malarial infection. He suggests that other factors, besides cold, may retard the development in the mosquitoes, and that one of these factors may be the species of animal on which the insects are afterwards fed.—U. F. Richardson.

Rao, M. A. N. (1938). **A Note on** *Plasmodium bubalis* **Sheather, 1919.**—*Indian J. vet. Sci.* **8.** 387-399. 1 plate. [2 refs.]

R. describes the schizogony of *Pl.b.* with the aid of a schematic diagram. All the forms described occurred in the blood of 11 buffaloes at the Madras Serum Institute in 1936. One animal showed haemoglobinuria and a rise of temperature for one day when the parasites were present in blood smears. R. describes three stages of the plasmodium, which grows in the erythrocytes of the buffalo, *viz*, (1) young ring forms (merozoites which have entered the erythrocytes), (2) trophozoites developing into schizonts, and (3) gametocytes. The young ring forms measured 1·5-2μ, the trophozoites from 2·5-3·5μ up to 5-6μ when fully grown ; what is presumed to be the female gametocyte was about 6μ in diameter. R. suggests that *Pl.b.* is a cryptic protozoon infection of buffaloes, *i.e.*, it shows itself in the presence of an intercurrent disease, such as rinderpest, or when vitality is lowered, as by bleeding for serum production.—J. A. Griffiths.

Simons, H. (1939). Sur les rapports des plasmodies paludiques et des piroplasmes avec les réticulocytes. [**The Relationship between Malarial Parasites and Piroplasms and the Reticulocytes**].—*Ann. Parasit. hum. comp.* **17.** 72-85. [Numerous refs.]

The reticulocytes are defined as immature red cells containing a granulofilamentous substance, and in normal human blood vary from about 0·5 to 1 % of the corpuscles. In canine blood and the blood of calves, a small number also occur, but they are said to be absent from the blood of adult cattle. Considerable difference of opinion exists amongst various authors as to how far malaria parasites have a predilection for reticulocytes, some authors saying that 95 % of these cells may be invaded, and others not being able to detect any selective action on the

part of the parasites. It is suggested that the only true criterion is to estimate the percentage of the available parasites which invade the reticulocytes, and calculations on this basis show there is no selective tendency towards these cells. It is emphasized that moist staining should be adopted; S. uses methylene blue and saponin. Staining of dry smears with Giemsa or other double stains may give unreliable results.

S. was able to examine the blood of dogs infected with *Babesia canis* and *B. gibsoni* and a bull with a double infection with *B. bigemina* and *B. argentina*. The babesia did not invade the reticulocytes, though it was noticed that in the dog 22·6% of these cells occurred, and that in the bull 0·5% were present although the animal was an adult.—U. F. RICHARDSON.

CERRUTI, C. G. (1939). Recherches sur les piroplasmose du porc. [**Piroplasmoses in Swine**].—*Ann. Parasit. hum. comp.* **17.** 114-136. 4 text figs., 10 figs. on 3 plates. [Numerous refs.]

Piroplasmosis of the pig has been described as occurring in Russia, Africa and Italy. The piroplasms conform with the description of *P. trautmanii* reported by TRAUTMAN from an outbreak in East Africa [(1921). MENSE. *Handbuch der Tropenkrankheiten.* **6.** 409. Leipzig: J. A. Barth]. The disease is common in Sardinia, in which country the present study was made. The symptoms include fever, haemoglobinuria, jaundice and anaemia. The incubation period is not known. Severe blood changes are observed microscopically; the leucocyte formula is much altered, with increase of large mononuclear and transitional neutrophile cells. The attack lasts for 7–8 days, and is fatal in untreated cases. A less severe form also occurs, chiefly in young pigs. P.M. appearances of liver, spleen, heart, kidney and lymph nodes are described in detail.

The piroplasm is seen in round or ring forms, and is rarely oval; pear-shaped and amoeboid forms also occur; 1-4 parasites may occur in a single corpuscle, and some 60% of corpuscles may be invaded.

Another type of piroplasm was also encountered, and the name *Babesiella perroncitoi* is provisionally given to this organism, which is much smaller and occurs in various shapes: 2-4 may invade the corpuscles, of which some 10% may be infected, and free forms also occur; round forms are observed in 70% of types. Anaplasma-like bodies were frequently observed in benign cases of piroplasmosis, but it is not possible to decide on their nature until inoculation experiments have been performed.

Rhipicephalus sanguineus, *Hyalomma aegyptum* and *Dermacentor reticulatus* were found on pigs with piroplasmosis, and it is intended accurately to establish the vector by experiments. Acaprin gave very good results in the treatment of both types of piroplasmosis.—S. J. GILBERT.

WOLFSON, F. (1937). **Experimental Transmission of *Toxoplasma* in Canaries.** —Copied *verbatim* from *J. Parasit.* **23.** 353.

An infection of *Toxoplasma* was discovered in May, 1937, in a canary which was kept in the laboratory for about 2 weeks, and was injected with sporozoites of *Plasmodium cathemerium* 11 days previous to its death. Various stages of *Toxoplasma* were observed in the circulating blood and in the internal organs, including the liver, spleen, lungs, kidneys, and bone marrow. The infection was transmitted to 13 canaries, to 5 from the original bird, and to the other 8 by a series of five subinoculations. Successful transfers were accomplished by intramuscular, intraperitoneal or intravenous injection of blood, bone marrow or brain tissue taken from dead birds. In nine cases the injections were performed within

one hour after the death of the bird ; in the other four cases they were done from 12-24 hours after death. One attempt to use the material from a bird dead more than 24 hours proved unsuccessful. The diagnosis of infection with *Toxoplasma* was in two cases by the examination of blood films, and in all cases by the study of tissue preparations stained with Giemsa. In addition to *Toxoplasma*, the experimental canaries carried plasmodial infections. All canaries died from 5 to 14 days after being injected with *Toxoplasma*. Since malaria seldom kills canaries in such a short period, the death of the birds was evidently due to the *Toxoplasma*. Autopsies always showed a typical pathology. Birds injected at the same time usually died on the same day. Three control canaries kept in cages with the birds carrying *Toxoplasma*, showed no infection.

SPENA, A. (1939). Sull-anaplasmosi dei bovini indigeni (bos indicus) del basso-piano occidentale Eritreo. [**Anaplasmosis in the Indigenous Cattle of the Western Plains of Eritrea.**—*Azione vet.* **8.** 129. 1 fig.

S. describes the finding of *Anaplasma marginale* in the R.B.C. of cattle brought to the Asmara market, Eritrea, to be slaughtered. Most of them seemed very fatigued after their journey, but soon recovered. A few showed more marked symptoms, such as anorexia, loss of rumination, fever, slight icterus and dispnoea, but apart from taking blood samples from 100 of the animals S. could not follow their subsequent history. He concludes that the infection became apparent after the lowering of their natural resistance as a result of their journey.

I. NEITZ, W. O., & THOMAS, A. D. (1938). **Rickettsiosis in the Dog.**—*J.S. Afr. vet. med. Ass.* **9.** 166-174. 34 figs. [6 refs.]

II. LAWRENCE, D. A. (1938). **Rickettsiosis in a Dog.**—*Ibid.* 175-178. 2 figs. [2 refs.]

I. A fatal disease of domestic and wild dogs which occurs in the southern portion of the Kruger National Park is described. The almost complete disappearance of the wild dog (*Lycaon pictus*) from the Park may be attributable to this disease. The cause is a *Rickettsia* (*R. canis*), which is present in the monocytes and neutrophiles. A jackal inoculated with infected blood became a carrier but showed no symptoms. The symptoms in dogs are a febrile reaction lasting three to four weeks with progressive anaemia and emaciation. No observations could be made on immunity as all the dogs in the experiment died. Drugs such as trypan blue and acaprin have no effect on the course of the disease. The only preventive measure is to keep dogs free from ticks.

II. A case of rickettsiasis in an old English Setter dog is described. The animal had been treated for biliary fever but continued to show a pronounced anaemia. Clumps of rickettsia organisms were found in the monocytes in a blood smear after a prolonged search for *Piroplasma canis*. Treatment with " akiron " was carried out and the dog eventually recovered. L. considers the *rickettsia* in this dog to be similar to the one described under the name of *R. canis* by DONATIEN and LESTOQUARD in Algiers in 1935 [*V. B.* **6.** 225].—E. M. ROBINSON.

BESSEMANS, A., WITTERBOLLE, P., & DE BORCHGRAVE, O. (1938). Leptospiroses canicole et ictérohémorragique en Belgique.—[*Leptospira canicola* **and** *L. icterohaemorrhagiae* **Infections in Belgium**].—*C. R. Soc. Biol. Paris.* **129.** 906-908. [Numerous refs.]

L. canicola and *L. icterohaemorrhagiae* are apparently rare in dogs in Belgium, although more than 31% of sewer rats are infected with the latter organism. Tests were made on 86 dogs, of which 6 had nephritis and one jaundice ; no

spirochaetes were seen in the urine: serological tests on 68 of the dogs were also negative, but the serum of the icteric dog lysed *L. canicola* at a dilution of 1:500 and 8 days later at a dilution of 1:5000. Cultures could not be grown from blood or urine. Only a few cases of Weil's disease in human beings have been recorded on Belgium; out of 358 samples of serum for the Wassermann test, one lysed *L. canicola* at a dilution of 1:200, and another lysed *L. icterohaemorrhagiae* at a 1:500 dilution.—M. L. BINGHAM.

DISEASES CAUSED BY VIRUSES

—. (1938). **Virus Diseases of Animals—General Discussion.** [Speakers: WATSON, E. A., ANDREWES, C. H., DAUBNEY, R., ALEXANDER, R. A., HENRY, M., OLVER, A., & DATTA, S. C. A.]—*Rep. 1st. Imp. vet. Conf. Lond., 1938.* 42-44. Weybridge: Imperial Bureau of Animal Health. [5s.]

Dr WATSON emphasized the increased importance of virus diseases. Fundamental research on the true nature of viruses is essential. An important development was the discovery that certain viruses can multiply greatly in the living chicken embryo. In equine encephalomyelitis the immunity derived from the inoculation of the chicken embryo virus is superior to that obtained from a vaccine-virus from the brains of infected horses.

Dr C. H. ANDREWES observed that the relative immunizing values of inactive killed virus and modified active virus must be given full consideration. Certain inactivated viruses make good vaccines only when they are inoculated into an animal of similar species to that from which the vaccine was originally obtained; this was found to be the case with the human influenza virus. Probably the inoculated animal reacts to the large quantity of foreign animal protein before antibody production against the virus is commenced; with a living vaccine this does not occur, as the virus multiplies rapidly in the inoculated host.

Mr DAUBNEY stated that in a part of Kenya the incidence of rinderpest had been greatly reduced by the use of inactivated vaccine. The vaccine is more effective if divided into two or three doses given at intervals. The attenuated rinderpest goat-virus had not been so successful in Africa as in India.

Mr ALEXANDER stated that the chemotherapeutic treatment of virus diseases was valueless. The possibility of a modified attenuated virus changing back into its virulent form should always be considered.

Mr MAX HENRY stated that swine fever immunization had been prohibited in Australia for 30 years. The importation of meat was not allowed from countries infected with F. & M. disease.

Col. Sir ARTHUR OLVER stated that the goat-virus vaccine had been found to be of great benefit in India; the immunity conferred appeared to be of at least five years' duration. For cattle of imported European breeds the goat-virus vaccine was dangerous, and the serum-simultaneous vaccine was to be recommended.

—E. C. HULSE.

—. (1938). **A Discussion on New Aspects of Virus Disease.** [Speakers: SALAMAN, R. N., SMITH, K. M., MACCLEMENT, W. D., BAWDEN, F. C., BERNAL, J. D., MCFARLANE, A. S., FINDLAY, G. M., WATSON, M. A., MURPHY, P. A., & ELFORD, W. J.]—*Proc. roy. Soc.* Ser. B. **125.** 291-310. [Numerous refs.]

SALAMAN, who opened this discussion, described six distinct strains of X-potato virus which could be differentiated by their reactions on potato or tobacco plants. The antigenic composition of these strains, the course of mutation and the protective value of weak strains against highly virulent strains were discussed.

SMITH and MACCLEMENT referred to the ultrafiltration of plant viruses. The small and medium sized viruses (18-20μ and 100-110μ, respectively) passed through membranes fairly easily, but the large particle viruses (400-700μ) did not readily filter. This is probably due to the low virus content of the sap. Attempts at concentrating these viruses led to loss of filtrability. The actual diameter of the particle size was also difficult to determine, owing to wide variations encountered according to the substrate in which the viruses were found.

BAWDEN discussed the crystalline and liquid crystalline states and described experiments on the concentration and purification of plant viruses by high-speed centrifugation.

BERNAL drew attention to the resolution of plant viruses by X-rays, and showed how the intramolecular pattern could be used to differentiate certain strains, *e.g.* tobacco virus. X-ray classification seemed to confirm the results obtained by serological and clinical observations.

MCFARLANE described experiments on the ultra-centrifugation of virus particles in different substrates with the object of determining the nature of their structure. His observations were amplified and criticized by ELFORD.

FINDLAY reviewed the methods adopted in recent years to produce mutation in viruses, while WATSON described experiments on the transmission of certain plant viruses by the aphis with particular reference to the effects of increasing infectivity by fasting the insects and to the influence of insect digestive enzymes on the plant viruses.

MURPHY considered the control of potato virus disease either by raising disease-free stocks or by protective inoculation with weak viruses.

[Readers are referred to a similar discussion at the Royal Society of Medicine —*V.B.* **9.** 80].—R. E. GLOVER.

NICOLAU, S. (1938). La para-immunité (résistance non spécifique acquise) dans les maladies à ultravirus. [**Non-Specific Resistance to Virus Diseases**].—*Rev. Immunol.* **4.** 263-286. [Numerous refs.]

In this review N. discusses heterologous immunity arising during the course of various infections, as exemplified by the presence of antibodies against one virus in animals immunized against another, *e.g.*, vaccinia and herpes, Aujeszky's disease virus and virus B, etc. It is suggested that the phenomenon may be due, in some instances, to previous inapparent infections (herpes) and in others to a purely non-specific increase in resistance, *e.g.*, poliomyelitis and Borna disease, pantropic Rift Valley fever virus and pantropic yellow fever virus, etc. In the last mentioned cases increase in resistance is probably of a cellular nature and comparable to that induced by various physical and chemical agents, *e.g.*, X-rays, Indian ink, tannic acid, sulphate of zinc, etc. It is pointed out that the immunity to heterologous agents is always on a much lower plane than to the homologous substances.

The complement-fixation reaction is considered to be unreliable in certain virus diseases, since non-specific fixation is often produced with viruses which are closely related.—R. E. GLOVER.

—. (1938). **Discussion on Foot and Mouth Disease.** [Speakers: CABOT, D. A. E., ANDREWS, W. H., DAUBNEY, R., DU TOIT, P. J., PURCHASE, H. S., LAIDLAW, P., NORRIS, J. H., BEVAN, L. E. W., & OLVER, A.]—*Rep. 1st Imp. vet. Conf. Lond., 1938.* pp. 34-39. [6 refs.] Weybridge: Imperial Bureau of Animal Health. [5s.]

Mr CABOT gave an account of the means by which F. & M. disease virus is introduced into Great Britain. The possibility of virus being imported on food

stuffs was considered ; it is unlikely that the virus on the grain survives in oil-cake, owing to the high temperature employed in its preparation. In 1926, an outbreak in cattle on a sewage farm was traced to the drainage emanating from a bacon factory where diseased pig carcasses had been imported from the Continent. This led to an embargo on meat from the Continent and at the same time considerable reorganization of meat inspection methods was carried out by the South American Republics.

During the winter of 1938, 260 outbreaks occurred in the Eastern and Southern counties ; these outbreaks appeared to coincide with the immigration of starlings from infected European countries. The theory that starlings may act as mechanical carriers of the virus received considerable support during this outbreak. One outbreak was traced to the injection of a cow with infected anterior pituitary extract manufactured on the Continent.

Dr Andrews referred to the establishment of a pneumotropic strain of the virus in hedgehogs. The use of hyperimmune serum minimized the effects of the virus but on direct exposure to infection small lesions were likely to develop; formolized vaccines could not be recommended.

Mr Daubney stated that field strains of virus isolated from cattle were liable to mutation during g. pig adaption ; the drawing of conclusions about type strains from g. pig experiments should be treated with considerable reserve.

Dr du Toit stated that in a country free from disease active immunization should be very carefully considered before being attempted, owing to the danger that the virus might be spread. He suggested that research work on F. & M. disease should be considerably expanded in Great Britain ; in particular, experimental work should be performed on cattle rather than on g. pigs.

Mr Norris stated that in Ireland very strict importation laws were imposed ; no biological products were admitted from infected countries.—E. C. Hulse.

Kanauka, K. (1938). Baltijos valstybiu konferencija priemonems kovai su snukio ir nagu liga apsvarstyti. [**Baltic States (Latvia, Lithuania, Estonia) Conference to Consider Means for Combating Foot and Mouth Disease**].—*Vet. ir Zootech., Kovno.* **15.** 33-37.

According to the report on the precautionary measures employed in all three countries, the following decisions were made :–

Transport of living animals and of raw materials into and through the country from countries infected with F. & M. disease was to be forbidden, and from unaffected countries it was to be allowed only after general precautionary measures had been taken. Imported raw products were to be sent direct to the factories. All transport vehicles were to be disinfected with 1-2% NaOH. An outbreak in any one of the Baltic States was to be immediately reported by telegraph to the State veterinary authorities of the other two. All cattle, sheep, goats, swine, dogs, cats and birds on the farms where the outbreak originated were to be immediately destroyed. If the disease had already spread in the district it was to be controlled by quarantine measures.—A. Pabijanskas (Kaunas).

I. Beller, K. (1938). Zur Epidemiologie der Maul- und Klauenseuche. [**Epidemiology of Foot and Mouth Disease**].—*Münch. tierärztl. Wschr.* **89.** 4-7. 3 figs., 1 table. [14 refs.]

II. Hirschfelder, H. S., & Wolf, J. (1938). Die Bedeutung von Insekten und Zecken für die Epidemiologie der Maul- und Klauenseuche. [**The Importance of Insects and Ticks in the Epidemiology of F. & M. Disease**]. —*Z. hyg. Zool. Schädlbekämpf.* **30.** 142-147. [18 refs.]

I. In discussing the epidemiology of F. & M. disease, B. points out that when an exceptional epizootic occurs it is often assumed that it represents infection with a new virus type, but that the recent outbreaks in Germany have been proved to be due to the recognized type A virus. He points out that statistics show that the virulence and the infectivity of F. & M. disease are not correlated characteristics, and that many of the most wide-spread outbreaks have been the mildest, but that sometimes the virulence varies enormously in neighbouring districts. It has been suggested that the recent serious spread in Germany was due to shortage of foodstuffs, but the evidence points to a decrease in susceptibility with a decrease in the standard of nutrition. It appears that seasonal and regional factors influence the course of the disease, but possibly these influence the host rather than the virus. The tendency for more severe epizootics to recur at intervals of 4-5 years is thought to depend mainly on the immunity of the animal population, and it is pointed out that English work [*V. B.* **8.** 129.] has shown that immunity to one virus type lasts 32-52 months.

The influence of other susceptible species requires further study, but it is pointed out that spread is almost entirely due to animal contacts, or to carriage of infection by human beings.

II. The authors review the literature dealing with the importance of flies and ticks in the transmission of F. & M. disease, and point out that in the case of non-biting flies all attempts to produce infection by these insects have failed, although the conditions of experiments have been much more favourable for transmission than those encountered naturally. It is doubtful whether these flies could carry sufficient virus to produce infection, and it is also noticeable that the prevalence of F. & M. disease is not correlated with that of these flies.

The cattle on the Island of Riems did not contract accidental infection, though the prevailing wind would carry flies from the mainland, which is only 800-1,500 m. away. Again, grasshoppers moving from an affected farm failed to infect pigs which ate them. As regards biting flies (*Stomoxys* and *Tabanus*), attempts at experimental transmission gave negative results, although it was shown that virus can survive in the intestines of these flies for 48 hours.

Virus can be detected for 30 days in the tick *Argas persicus* after an infective feed, and *Boophilus annulatus* has been blamed for the maintenance of F. & M. disease in certain areas in America, but again attempts to transmit infection by means of these ticks have failed, as have attempts to show that the virus might be passed through the eggs in the case of *B.a.*, and through a moult in the case of *Ixodes ricinus*.—U. F. Richardson.

I. Anon. (1937). Uebertragung der Maul- und Klauenseuche durch Schalenwild. [**Transmission of F. & M. Disease by Deer**].—*Dtsch. tierärztl. Wschr.* **45.** 822.

II. Waldmann, O., & Hirschfelder, H. (1938). Die epizootische Bedeutung der Ratten, des Wildes, der Vögel und der Insekten für die Verbreitung der Maul- und Klauenseuche. [**The Importance of Rats, Wild Animals, Birds and Insects in the Transmission of Foot and Mouth Disease**].—*Berl. tierärztl. Wschr.* April 22nd. 229-234. [Numerous refs.]

III. Rosenhaupt, H. (1938). Verbreiten Ratten Maul- und Klauenseuche? [**Rats as Possible Spreaders of F. & M. Disease**].—*Berl. Münch. tierärztl. Wschr.* Aug. 5th. 470-471.

IV. Stroh. (1938). Maul- und Klauenseuche und das Wild. [**F. & M. Disease in Game**].—*Münch. tierärztl. Wschr.* **89.** 229-231.

V. ANON. (1938). Schalenwild und Maul- u. Klauenseuche (M.u.KS). [**The Role of Deer in the Spread of F. & M. Disease**].—*Berl. Münch. tierärztl. Wschr.* Aug. 5th. 471.

I. Strict regulations in Oldenburg and Ammerland enforce the inspection by veterinary surgeons of all game brought in by hunters, but so far not a single case of infection of the animals with F. & M. disease has been established. It is concluded, therefore, that infection of roe deer with the disease is exceptional, and that the animal is not likely to play any significant part in the transmission of the infection to cattle. Experiments in this district are being continued with a view to settling this question.

II. From a survey of investigations in different countries, and more especially in Great Britain, the authors conclude that very little, if any, importance is to be attached to the agency of rats, other wild animals, birds and insects in the distribution of F. & M. disease in European countries. In regions where the disease is very prevalent, the rat may occasionally serve as a mechanical vector of the virus, but its disinclination to wander any distance from its nesting centres, and the absence of observations of recent considerable migrations from one locality to another makes it unlikely that rats carry the infection far afield. Reports of the occurrence of F. & M. disease in wild game in European countries have been shown repeatedly to lack scientific confirmation. Artificial infection of birds can be induced only with considerable difficulty, so that natural infection is not likely to occur. Birds might perhaps transfer the virus mechanically for short distances, but transportation for considerable distances by migratory birds is out of the question. The same also applies to insects, especially the house-fly. In the authors' opinion, the disease is mainly spread by man.

III. R. disagrees with WALDMANN and HIRSCHFELDER's contention [see II, above] that, owing to a disinclination to wander far afield from its breeding centres, the rat does not play an important part in the distribution of F. & M. disease. His own observations indicate that rats frequently cover distances of several kilometres in a single night, as shown by their tracks in the snow, and that they even cross broad streams of water. He suspects that rats commonly visit neighbouring farms, and that they may well serve as vectors of the infection.

IV. S. states that investigation by veterinarians into the reports from local police officers and cattle owners in various parts of Germany, attributing the death of roe deer and other game to F. & M. disease, has shown that the death of these animals was due to other causes. With reference to the few cases where game kept in captivity were successfully infected artificially, he states that the susceptibility to infection of these animals is not comparable with that of farm stock. In his view, game does not play any significant part in the distribution of F. & M. disease in European countries; he considers it to be mainly spread by man.

V. From a brief survey of the investigations recently carried out by STROH [see IV, above], and by WALDMANN and HIRSCHFELDER [see II, above], and other workers, into the reports recording the occurrence of F. & M. disease in roe deer and other wild game in various localities in Germany, it is concluded that while these animals may occasionally be infected by this disease, they do not play any important part in its transference to domestic animals in Germany.

KRAUSE, C. (1938). Zur bösartigen Form der Maul- und Klauenseuche und ihren morphologischen Grundlagen. [**The Malignant Form of Foot and Mouth Disease**].—*Münch. tierärztl. Wschr.* **89.** 2-4. [9 refs.]

A general description, with quotations from the literature, of three forms of

F. & M. disease :– benign dermo-stomatitis, the intermediate toxic form with more severe illness, and the so-called malignant form with heart and skeletal muscle changes superimposed on the foot and mouth lesions.—J. E.

CARMICHAEL, J. (1938). **Rinderpest in African Game.**—*J. comp. Path.* **51.** 264-268. [9 refs.]

Reference is made to previous reports of rinderpest in African game and of the varying degrees of susceptibility to the disease of different species.

The buffalo is recognized as the most important wild animal disseminator of rinderpest in Uganda, but field observations indicate that the virus looses some virulence by passage through it. Apparently waterbuck (*Kobus ellipsiprimus* and *K. defassa*) are rarely infected naturally, but have proved susceptible to artificial inoculation. Natural outbreaks in cob (*K. thomsa*) have been recorded, but this animal would appear to have a high natural resistance. Sitatunga (*Tragephalus spekei*) and bushbuck (*T. sylvaticus*) are highly susceptible. Reedbuck (*Redunca spp.*) (*Cervicapra spp.*) and oribi (*Rhaphiceros spp.*) are usually considered highly resistant in their natural state, but acute attacks of the disease among laboratory animals are described.

Eland (*Taurotragus sp.*) are very susceptible and are an important means of spreading the disease owing to their living in close contact with cattle and to their habit of covering long distances.

The pig (*Potamochoerus spp.*, *Phacochoerus spp.* and *Hylochoerus spp.*) is highly susceptible and is a source of danger to other animals owing to its ubiquitous distribution. There would appear, however, to be a fall in virulence of the virus after passage through the pig.—F. J. ANDREWS.

PURCHASE, H. S. (1939). **Vaccination against Contagious Bovine Pleuro-Pneumonia with "Culture-Virus".**—*Vet. Rec.* **51.** 31-47 and 67-75. 12 figs., 27 tables, 1 chart. [Numerous refs.]

P. gives his experience in Barotseland, Northern Rhodesia, when investigating the possibility of controlling the disease by the use of Kenya culture virus. He found that the 11th to the 45th generations were harmless to Barotse and Mashukulumbwe cattle of all ages. Reactions to inoculations were mild and occurred more often in Barotse cattle (there were glandular swellings in 40% of Barotse cattle inoculated and slight temperature reactions in young animals of both breeds). Barotse cattle are said to have been readily immunized, but only 30-60% of Mashukulumbwe cattle could be successfully immunized. An increased dose of vaccine, within limits, is thought to immunize an animal sooner, and it also reduces the number of injections considered necessary from three to two. P. recommends two doses of culture virus at 21 days' interval, with a first dose of 2 c.c. for adults, and 1 c.c. for calves, and a second dose of 5 c.c. and 3 c.c. respectively. Massive doses of culture virus are said to be as safe as the moderate doses usually given. Culture virus can be successfully stored for a month under field conditions in a kerosene-operated refrigerator. No "lunger" was found to harbour virus when lesions were fully organized nor where the sequestrum had been completely liquefied. P. considers that the longer a "lunger" survives, the less is the danger of it acting as a "carrier" of the disease. Virus was demonstrated in five cows four months after clinical recovery from the disease, but in only one of four animals six months after clinical recovery. According to P. it has been suggested that, as a result of passage by subcutaneous inoculation, there was partial loss of virulence, but that virulence was restored if the virus was passaged through an animal which had received vaccine but had not yet acquired immunity. He suggests the animals were hypersusceptible at this negative stage in the development of immunity.

The method of vaccination with culture virus was applied under field conditions. This method of attempting to control the disease has been extensively employed in the Sudan and Nigeria, and also used in Kenya and the Gold Coast with fairly satisfactory results. In Tanganyika the results were not so favourably reported on. P. states that the use of N.A.B. as recommended by CURASSON [(1929). *Bull. Acad. vét. Fr.* **2.** 300.] has been found valueless when symptoms have been observed in the animals for more than one day. BENNETT's statement [(1932). *J. comp. Path.* **14.** 257.] is quoted on culture vaccine—" the immunity produced is of considerable duration "—and also the fact that local tests had shown it to last two years. [Nigerian results 1931 to 1938 show an immunity of very short duration which takes at least three weeks to acquire. The value of this method of immunization in Nigeria has proved doubtful when the disease has once appeared in a herd].—J. A. GRIFFITHS.

I. ANON. (1938). **You Can Prevent " Sleeping Sickness " from Affecting Your Horses and Mules.** p. 1. Chicago : Horse and Mule Association of America. [4to].

II. ANON. (1938). **Prevent Sleeping Sickness in Horses.** p. 1. Chicago : Horse and Mule Association of America. [4to].

III. ANON. (1938). **Redouble your Efforts to Prevent Sleeping Sickness.** pp. 3. Chicago : Horse and Mule Association of America. [4to] [Mimeographed].

IV. ANON. (1938). **" Sleeping Sickness " [Equine Encephalomyelitis] in the Middle West.**—*Science.* **88.** Sept. 16th. p. 9 of Suppl.

V. SCHOENING, H. W. (1938). **Control of Equine Encephalomyelitis (Sleeping Sickness).**—*Leafl. Horse and Mule Ass. Amer.* No. 234. pp. 32.

VI. ANON. (1938). **Present Status Horses and Mules [Equine Encephalomyelitis].** pp. 4. Chicago : Horse and Mule Association of America. [4to] [Mimeographed].

I-III. These notices urge the wide-spread adoption of preventive measures against summer epizootics of equine encephalomyelitis in the U.S.A. The first essential is to protect the animals against the mosquitoes and biting flies which are the carriers of the disease. Work horses should be sprayed with insect repellent, kept in screened stables, and fed " green hay ". Pastured horses and mules should be brushed over once or twice a week with a suitable fly-repellent mixture.

IV. A summer epizootic of equine encephalomyelitis, referred to as " sleeping sickness ", occurred in three middle western states, with 33,000 deaths. Infection was transmitted by five species of mosquitoes and probably also by biting flies.

V. A general address on the measures to be taken to control the disease. Vaccination is mentioned. Referring to the source of virus infection, S. points out that many birds are susceptible to the virus and suggests that migratory birds may act as hosts. Projected eradication methods are also discussed.

VI. The non-virus type of equine encephalomyelitis, due to " forage poisoning ", may be avoided by strict attention to diet. In areas where the virus infection has appeared in the last ten years 25 % of the animals have been affected. This notice urges the adoption of control measures and the prompt treatment of infected horses. Hygienic precautions and careful nursing are advocated.

I. DELAGE, B. (1938). Le système liprotéidique du sérum au cours de l'anémie infectieuse et de la dourine chez les équidés. **[The Serum Lipoids and Proteins in Equine Infectious Anaemia and Dourine in Horses].**—*C. R. Soc. Biol. Paris.* **128.** 985-986. [5 refs.]

II. WITTFOGEL, H. (1938). Ueber den Cholesteringehalt des Blutserums mit ansteckender Blutarmut behafteter Pferde. [**The Cholesterin Content of the Blood Serum of Horses Affected with E.I.A.**].—*Z. InfektKr. Haustiere.* **54.** 135-142. 4 tables. [16 refs.]

I. D. found that in horses and donkeys with typical symptoms of E.I.A. or dourine, the extractable lipoid : protein ratio in the blood serum was markedly below normal ; the decrease corresponded with that established by him in certain other pathological conditions in animals, and constitutes, in his opinion, an important characteristic of a " state of serious disease ".

II. From the tests described W. concludes that the cholesterin content of blood serum is not significant for the diagnosis of E.I.A. in horses, since it was found to fluctuate within very nearly identical limits in both healthy and infected animals. A slight but not significant increase was observed in febrile attacks following inoculation with the virus.

FORTNER, J. (1938). Der Stand der Erkenntnisse über die ansteckende Blutarmut der Einhufer. [**Present State of Knowledge on Equine Infectious Anaemia**]. —*Berl. Münch. tierärztl. Wschr.* Dec. 9th. 751-752. [Also appeared in *Dtsch. tierärztl. Wschr.* **47.** 49].

The virus is present in all the organs of infected animals, and it is disseminated in the faeces, urine, and milk. While the resistance of the virus to inactivation is very considerable, recent work has shown that 0·5% phenol inactivates it after three months at 14°-15°C. ; a law has therefore been enacted in Germany, decreeing that E.I.A. sera prepared with 0·5% phenol must be stored for at least three months before use. Recent research tends to implicate biting insects (tabanids) in the spread of the infection. The virus has been found to persist in the blood of horses for as long as 14 years after clinical recovery ; such carriers are immune to reinfection. No effective cure of the disease has yet been found.

Accurate diagnosis of E.I.A. requires that the suspected animals should be kept under close observation for weeks or even months, their temperature being taken twice daily ; in the study of the blood, the sedimentation rate is of value, a sedimentation of 50% in 15 minutes indicating infection ; valuable information may also be obtained by cross-inoculations with the sera of the horses under observation. In briefly reviewing the measures prescribed in the different provinces of Germany for the control of this disease, F. considers that all outbreaks should be made notifiable, and advocates stricter quarantine measures and the destruction of latent carriers of the virus.

MEYER, H. (1938). Haben sich die vom Oberkommando des Heeres am 21.12.1936 zur Bekämpfung der ansteckenden Blutarmut der Pferde erlassenen Bestimmungen als ausreichen zur Tilgung der Seuche innerhalb der Wehrmacht erwiesen ? [**The Efficacy of the Measures Taken to Eradicate Equine Infectious Anaemia in the German Army**].—*Z. Veterinärk.* **50.** 386-404 and 433-450. [Numerous refs.]

Since the issue at the end of 1936 of orders for the control of E.I.A. in the German army, observations have shown that the disease is mostly present now in a chronic or latent form in army horses, the infected animals hardly showing any signs at all of infection. Observations during life and autopsy of 29 army horses which had died of E.I.A. before the present régime was started, confirmed the value of erythrocyte sedimentation tests in diagnosis. Useful information may also be obtained from liver puncture. One difficulty in controlling E.I.A. is its introduction by remounts purchased in affected areas.

I. Cilli, V. (1938). Studio di un focolaio di anemia infettiva dell'asino in Eritrea. (Considerazioni patogenetiche con le anemie perniciose dell'uomo). [**Equine Infectious Anaemia in Donkeys in Eritrea**].—*Nuova Vet.* **16.** 179-226. 37 figs. on 8 plates, 9 tables, 4 charts, 13 graphs.

II. Marcato, A. (1938). Studio anatomo-isto-patologico su di un focolaio di anemia infettiva dell-asino in Eritrea. [**Histopathological Study of an Outbreak of E.I.A. in Donkeys in Eritrea**].—*Ibid.* 227-239. 5 plates.

I. An outbreak of infectious anaemia occurred in a herd of 1,300 donkeys in Eritrea, some of which had come from the Anglo-Egyptian Sudan and some from Cyprus. Prior to the arrival of the donkeys, none of the horses or mules with which they were subsequently in contact had shown signs of the infection. Under experimental conditions the infection was reproduced in donkeys by various methods, *e.g.* subcutaneous or intravenous injection of serum of affected animals, or by contact with infected animals. Of 14 donkeys experimentally infected two had acute, seven sub-acute, and five chronic infections. Horses and mules did not seem to be very susceptible to the virus, but donkeys seemed to be very susceptible to experimental infection.

Haematological observations gave results as in infected horses. The coagulation of the blood was delayed and the volumetric index was reduced from 30 to 22. The normal ratio of red blood cells, white blood cells and plasma was changed from 1·09 : 0·04 : 2·19 to 1·21 : 0·04 : 3·74, with a reduction of the erythrocyte column in favour of the plasma column. The serum was thick and dark yellow and the van den Bergh reaction was negative. The refractometric index was reduced from nD 1,35007, the normal, to nD 1,34898 during infection. The haemoglobin content was decreased from 61 % to 53 %. There was practically constant leucocytosis. C. considers that Fulton's serum globulin reaction is useful in diagnosis.

Four adult hens were inoculated intramuscularly into the breast with 5 c.c. of serum from three naturally infected donkeys. Seven days later they were killed and histological examinations made of their livers, which showed small foci round the blood vessels composed of accumulations of lymphocytes with some granulocytes. There was no erythrophagy by the Kupffer cells and no hepatic cellular lesions.

Tables are given illustrating the course of infection in the donkeys, and are discussed.

II. This is a detailed description of the histological and macroscopic picture of the donkey cases, in part a repetition.

Oppermann, T., & Stümpke, G. (1937). Der Lippengrind (Ekthyma contagiosum) der Schafe und seine Uebertragbarkeit auf den Menschen. [**Lip Scab of Sheep (Contagious Pustular Dermatitis) and Its Transference to Man**]. —*Arch. Derm., Berl.* **176.** 337-346. 3 figs. [25 refs.]

The authors give a detailed description of the disease in sheep, quote some published cases of human infection from sheep and record a case of ecthyma in a shepherd whose sheep and lambs were nearly all affected. The shepherd developed small scabby lesions on his hands and neck which soon recovered under local treatment. The infection was transmitted experimentally to a healthy lamb by material collected from the shepherd, and from two of his affected lambs to two healthy lambs.—J. E.

Burnet, F. M., & Lush, Dora. (1938). **Infection of the Central Nervous System by Louping Ill Virus. An Investigation by the Quantitative Egg Membrane Technique.**—*Aust. J. exp. Biol. med. Sci.* **16.** 233-240. 5 tables. [7 refs.]

Using the quantitative egg membrane technique, the authors studied the

infection of the C.N.S. of the mouse by " louping ill " virus. They found that when the virus is inoculated intraperitoneally it usually enters the C.N.S. *via* the olfactory mucosa and olfactory bulb, but not invariably. Trauma of the cerebral hemisphere of mice so inoculated allowed the virus to enter at the point of damage and accelerated the spread of infection. After intranasal inoculation, the virus entered the olfactory bulb and multiplied there, reaching a high concentration before the rest of the brain became infected. This suggested that there is a " physiological barrier " between the olfactory bulb and the rest of the brain. Once the infection passed beyond this barrier it spread rapidly down to the spinal cord and the virus was detectable in large amounts everywhere.—T. S. Gregory.

Ratti, R. (1938). L'agalassia contagiosa delle capre e delle pecore in Val Bregaglia, Cantone dei Grigioni. [**Contagious Agalactia of Goats and Sheep in Switzerland**].—*Schweiz. Arch. Tierheilk.* **80.** 317-320. [In Italian].

Two thirds of the cases were of the chronic type with eye infections, arthritis, abscess formation in the lymph nodes and mammary glands and in the lungs and liver. Induration of the udder was very frequent. The local breeds seem to be more resistant than imported breeds. The annual mortality from this disease during the years 1931-1936 was 6% in adult goats and 1% in adult sheep. During the winter season the incidence of acute mastitis due to this virus falls because there are then only a few animals in full milk. The disease was less frequent in sheep than in goats.

Every method of chemical or serological treatment tried was unsuccessful. The most effective method of dealing with the disease is the elimination of infected animals and a periodical examination of the herd. It is suggested that there may be some connexion between contagious agalactia and worm infestation (though experiments to prove this have not so far been successful), or that the environment may play some part in the incidence of the infection.—Hans Graf (Zürich).

Kriesel, H. R. (1938). **A Comparative Study of the Manifestations and Histopathology of Canine Distemper and Experimental Fox Encephalitis Infection in Dogs.**—*Cornell Vet.* **28.** 324-330. [8 refs.]

Fifty-four puppies and seven ferrets were inoculated with dog distemper, and 14 puppies and one ferret with the virus of fox encephalitis.

Marked enlargement and oedema of the mesenteric lymph nodes were constant lesions P.M. in the animals affected with dog distemper. Nuclear inclusions occurred in ten puppies, and cytoplasmic inclusions were numerous in all of the ferrets. Variations in dosage of virus, portal of infection and stage of the disease at examination did not materially alter the findings.

The fox encephalitis virus produced a rapidly fatal disease in nine of the puppies, but no symptom of illness in the ferret. Autopsy revealed oedema and petechiae of the thymus and of the mediastinal and mesenteric lymph nodes, subendocardial haemorrhage, ecchymoses in the lungs, and an excess of peritoneal fluid. Nuclear inclusions appeared in all of the puppies which became infected, but cytoplasmic inclusions were absent except in one atypical case.

The nuclear inclusions in both diseases were composed of minute pink-staining granules, which in aggregate produced a darker homogeneous body.—D. D. O.

Green, R. G., & Evans, C. A. (1939). **Rapid Diagnosis of Canine Distemper.** —*Cornell Vet.* **29.** 36-40. 2 figs. [14 refs.]

Emphasis is laid on the importance of an early and accurate diagnosis of distemper in kennels and fur animal ranches.

The distribution of inclusion bodies, characteristic of canine distemper, in surface epithelium and other tissues is described, and it is stated that an accurate diagnosis of the disease may be obtained by the demonstration of these inclusions in paraffin sections stained with haemotoxylin and eosin. The authors have now elaborated a method whereby the inclusion bodies may be demonstrated within one hour. Smears of scrapings are taken from the lining of the bladder (or if necessary from the trachea and nasal chamber) of two or three animals which have died from the disease or been killed late in its course and are examined for the presence of the characteristic inclusion bodies. Methods of fixing and staining are described.—F. J. ANDREWS.

HERZBERG, K. (1938). Untersuchungen an Influenza-Virus-Stämmen. [**Research on Influenza Virus**].—*Zlb. Bakt. I. (Orig.).* **143.** 93-106. [12 refs.]

A report of parallel experiments carried out with two strains of influenza virus, one being of human and the other of porcine origin. In general both strains behaved in an identical manner in all tests. Mouse passage by the intranasal route produced in both cases bronchitis and broncho-pneumonia. Culture of virus from mice into eggs and reinoculation into mice produced no change of pathogenicity of either virus. The lesions produced in the egg embryos were similar and the resistance to glycerin of egg-culture virus of both was the same. In neither case did virus-infected mice show any specific secondary bacterial infections. The filtrability of both viruses was the same.—E. J. PULLINGER.

HUPBAUER, A. (1938). Značenje gripe prasadi za naše svinjogojstvo. [**Significance of Piglet Influenza in Swine Breeding in Yugoslavia**].—*Arhiv Minist. Poljopriv., Belgrade.* **5.** No. 12. 119-129. 1 fig., 1 table. [13 refs.] [German summary]. [See also *V. B.* **9.** 469].

An account of the epizootology, aetiology and pathological findings of swine influenza. Control measures are discussed, with particular reference to the method of eradication advocated by WALDMANN [*V. B.* **8.** 90.] which was used with good results at the Križevci Institute in Yugoslavia. The disease is very serious each year in Yugoslavia, the losses being 5-85%, and sometimes even 100%, of the piglets on affected farms, especially among autumn and winter litters.

—B. OSWALD (KRIŽEVCI).

DIAS, E. (1937). O cão como provavel reservatorio do virus da febre maculosa brasileira. [**The Dog as a Natural Reservoir of Brazilian Typhus**].—*Brazil-med.* **51.** 1245-1247.

Dogs in affected areas have shown positive Weil-Felix reactions; the susceptibility of dogs to the virus has been demonstrated, and they are hosts of the ticks responsible for infection. For these and for epidemiological reasons, D. considers it very probable that the dog is a natural reservoir of the virus.

I. BLANC, G., & MARTIN, L. A. (1936). L'iridocyclite typhique expérimentale. [**Iridocyclitis in Typhus**].—*Arch. Inst. Pasteur Maroc.* **1.** 391-463. 8 plates, 1 table, 79 graphs. [9 refs.]

II. BLANC, G., & MARTIN, L. A. (1936). Le typhus expérimental de l'âne (virus murin). [**Experimental Typhus in the Donkey**].—*Ibid.* 473-505. 1 table, 22 graphs. [14 refs.]

I. Acute iridocyclitis was set up in sheep and donkeys inoculated with murine typhus virus into the anterior chamber of the eye. The virus did not

become generalized in the body and the infection did not immunize the eye against reinfection.

II. The intravenous inoculation of typhus fever virus into donkeys caused no loss of health and only gave rise to transient fever, during which the serum gave a positive Weil-Felix reaction and possessed some neutralizing power against virus. These properties were, however, soon lost after the return of the temperature to normal.—J. E.

PURCHASE, H. S. (1939). **An Outbreak of Infectious Roup in Young Chickens.** —*Vet. Rec.* **51.** 3-16. 4 figs. on 1 plate, 2 tables. 1 graph. [Numerous refs.]

P. first reviews the literature on catarrhal or diphtheritic affections of the nose, mouth and eyes of fowls, commencing with LOEFFLER's (1884) investigation of avian diphtheria. The problems arising from confusing nomenclature, complications by secondary invaders and differential diagnosis of this group of diseases are discussed.

The article then outlines an investigation of avian roup of young chickens (" one-eyed roup ") caused by a virus [not the same as the other form of roup, which occurs in adult birds, and is primarily associated with a bipolar staining organism]. After inoculation of filtered and unfiltered material by various routes, the period of incubation was between 4 and 10 days ; after contact with infected fowls it was 5-11 days, and following contact with infected materials it was 11-20 days. No temperature reaction occurred. The symptoms (including severe catarrh of the respiratory tract, lachrymation, conjunctivitis, diarrhoea and emaciation) and the lesions produced are all minutely described. Birds up to six weeks of age were most susceptible ; infection was less certain in six-month-old birds, and adult birds were refractory to infection. No cross-immunity between this disease and fowl pox occurred.

Two species of bacteria were recovered from blood and bone-marrow of naturally affected chicks. One was non-pathogenic, but the other set up necrosis at the point of inoculation and caused death from septicaemia in fowls. Acute septicaemia also occurred in pigeons and rabbits, but g. pigs were more refractory. The organism was Gram-negative and bipolar ; its cultural and biochemical characters are detailed. Experiments showed that whole cultures and filtrates of cultures of these bacteria did not set up a roupy condition or any immunity to roup in susceptible chicks.

The methods of experimental and natural passage of the disease and the distribution of the virus in affected chicks are discussed, and the differential diagnosis from fowl pox, gapeworm disease and nutritional roup is outlined.

—C. V. WATKINS.

VAN RAECKEL, H., BULLIS, K. L., & CLARKE, M. K. (1938). **Preliminary Report on Infectious Avian Encephalomyelitis.**—*J. Amer. vet. med. Ass.* **93.** 372-375. 3 tables. [3 refs.]

The incidence of this disease appears to be on the increase, particularly in the New England States. The authors confirmed the findings of JONES [(1932). *Science.* **76.** 331.] that the aetiological agent is a virus. The symptomatology of the disease is described. It was transmitted by intracerebral inoculation and by contact. The virus increased in virulence with passage. The evidence available fails to establish the presence of " carrier " birds amongst the survivors of a naturally-occurring outbreak, although the disease appears to be egg-borne and the breeding stock serve as the reservoir of infection.—L. E. HUGHES.

NAKAMURA, J., OYAMA, S., & WAGATSUMA, S. (1937). **Vaccination of Fowls against Chosen Disease (Newcastle Disease) and Fowl Plague.**—*J. Jap. Soc. vet. Sci.* **16.** 427-444 of pt. 1. 10 tables. [17 refs.] [In Japanese: abst. from English summary pp. 55-58 of pt. 2].

The authors attempted immunization against Newcastle disease with several vaccines prepared from a highly virulent virus (strain H). Saline suspensions of infected organs were treated with formalin, chloroform, toluol or tricresol and kept at 37°C. for varying periods, or treated with glycerol or saccharose and heated at different temperatures. Subcutaneous and intramuscular injection of a formolized vaccine, the preparation of which is detailed, gave poor results, but intravenous injection was more efficient, double injections by the latter route at an interval of 5-7 days giving immunity in 54 out of 87 birds 14 days after the last dose, whereas all controls died. The efficiency of different batches of vaccine varied in spite of careful preparation. The other vaccines prepared gave inferior results.

Tests of a formolized fowl plague vaccine prepared similarly to the one described above for Newcastle disease were made with better results; again useful results were only obtained by the intravenous route. Three batches of vaccine were potent after storage for 133 days in a cool room. The immunity was equally good 10 and 107 days after vaccination, but it was reduced after 121 days. Single vaccination by intravenous injection often produced solid immunity, but not as certainly as double administration of the same total dose at an interval of five days.—C. V. WATKINS.

BEAUDETTE, F. R., & HUDSON, C. B. (1938). **Cultivation of Pigeon-Pox Virus on the Chorio-Allantoic Membrane.**—*J. Amer. vet. med. Ass.* **93.** 146-150. 1 table. [2 refs.]

A method of obtaining a pure pigeon-pox virus in culture on the chorio-allantoic membrane of embryonated eggs 9-15 days old is described, followed by serial passage through 19 generations of tissue culture. On account of the great affinity this pox has for follicular cells, which are always subject to bacterial contamination, Berkefeld filtration was essential for the primary culture. Most growth occurred after five days' incubation of the inoculated eggs, the lesions produced in the membranes being identical with those due to fowl pox. The virus withstood up to 38 days' refrigeration between passages, but the virulence of infected membranes was slightly reduced thereby. In neutralization tests with virus and immune serum there was an absence of marked generalized infection of inoculated membranes as compared with lesions produced by virus alone.

Membranes dried *in vacuo* gave " takes " when chickens were inoculated by scarification with concentrations of 0·625 mg. (or more) per c.c. of 50% glycerin solution. Field tests of such vaccines are briefly mentioned.—C. V. WATKINS.

I. LEVADITI, C., FASQUELLE, R., BEQUIGNON, R., & REINIÉ, L. (1938). Influence des *sélecteurs* sur le potentiel encéphalitogène du vaccin jennérien. [**Influence of " Selectors " on the Encephalitogenic Potentialities of Vaccine Virus**].—*C. R. Acad. Sci., Paris.* **207.** 688-690. [3 refs.]

II. LEVADITI, C., FASQUELLE, R., MESROBEANU, J., REINIÉ, L., STAMATIN, L., & BEQUIGNON, R. (1938). Les "selecteurs". [**"Selectors"**].—*Rev. Immunol.* **4.** 481-497. 6 figs. [Numerous refs.]

I. In order to explain differences in the affinities for certain tissues of various strains of vaccinia, the authors postulate the existence of epitheliotropic (E) and mesodermotropic (M) elements.

The modification in the virulence of a dermotropic strain and its transformation into neurovaccine depends partly on the proportion of the two elements in a given strain and partly on the selective effect of different methods of propagating the virus, *e.g.*, intracerebral inoculation of rabbits, cultivation in the developing egg, growth in symbiosis with neoplasms, etc. The tissues are regarded as " selectors " of E and M elements respectively.

Experiments with stored virus appeared to demonstrate fluctuations in the proportions of the two elements. Thus, dermovaccine stored at –2°C. was titrated at intervals by the intracerebral inoculation of rabbits. The number of successful " takes " in the brain was 33% at the 8th day, none at the 82nd, 40% at the 96th, and 55% at the 143rd.

II. Similar to I, but in more extended form.—R. E. GLOVER.

AHLSTRÖM, C. G. (1938). **Virus Tumours in Mammals.**—*Acta path. microbiol. scand.* Suppl. No. 38. pp. 37-46. [Numerous refs.] [In English].

A. reviews the bearing of recent investigations into the tumours of small animals on the aetiology and spread of neoplasms in general. Particular reference is made to the rabbit papilloma virus of Shope and to the experiments of ROUS, KIDD and BEARD [*V. B.* **7.** 331.] on the conversion of papillomata into malignant growths by tar, etc ; and to the experiments of ANDREWES and AHLSTRÖM [*V. B.* **9.** 392.] on mutation in rabbit fibroma lesions as a result of tarring. The review contains no new facts.—R. E. GLOVER.

PARASITES IN RELATION TO DISEASE [GENERAL]

CANADA. (1937). [**Report of**] **Associate Committee on Parasitology. [National Research Council, Canada, 1936-1937]**.—*Rep. nat. Res. Coun. Can. 1936-37.* pp. 106-113. 1 table.

The making of cinematograph films of parasites is reported, and models of various domestic mammals are under construction showing parasites in the organs naturally infected. A cabinet to permit the rapid growing of " worm-free " grass is being obtained, which will aid research into helminthiasis.

HORSE STRONGYLE CONTROL.—Experiments by Dr PARNELL made rapid progress due to provision of more equipment and improved techniques. 3,000 cultures have been completed and 54 chemicals tested for lethal effect.

LIVER FLUKE DISEASE.—Dr SWALES finds evidence that the large Bovidae are naturally resistant to *Fasciola magna*, and that the host-tissue defence prevents reproduction of the parasite. Sheep, however, may die of the infestation.

WARBLE FLY ERADICATION.—Rotenone in oil was disappointing as compared with standard derris powder and soap.

NODULAR DISEASE.—The best form of attack is believed to be destruction of adult parasites [*Oesophagostomum columbianum*] in the young host held over for breeding purposes. Dr SWALES has designed an instrument for use in an endeavour to facilitate delivery of suitable anthelmintics into the abomasum.

STOMACH WORMS OF SHEEP.—Results of 134 autopsies and a suggested treatment for *Trichostrongylus axei* are given.

TAPEWORMS OF SHEEP.—The life-cycle of *Moniezia expansa* is being studied, also the habits of miscellaneous parasites in sheep and other animals, fish, birds, etc.—C. MACKIE.

CERUTTI, C. G. (1937). Importanza della lotta contro le malattie parassitarie che dominano in Sardegna, nei suoi reflessi con l'autarchia della nazione. [**Importance of Controlling Parasitic Diseases of Animals in Sardinia**].—*Azione vet.* **6.** 876-883.

C. estimates that 8% of the beef, 25% of the mutton and goat flesh, and 2% of the pork in Sardinia has to be rejected on account of parasitic infestation. It is also responsible for a loss of 15% in the milk yield and 15% of the hides and skins. 20% of the cattle, 6% of the sheep and 10% of the goats die every year as a result of parasitic diseases, the estimated total loss being about £9,000,000 *per annum*.

The system of communal farming that obtains in Sardinia hinders the control of helminth infestation, and C. thinks that the cleansing of the communal pastures should be undertaken by the State or by local authorities. Other methods of control, *e.g.*, by removal of the animals from infected pastures, burning and dressing of pastures, use of anthelmintics, etc., are also discussed.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

FELT, E. P., & COLCORD, Mabel. [Editors]. (1938). **Index V to the Literature of American Economic Entomology. January 1, 1930 to December 31, 1934.** pp. 693. Maryland: American Association of Economic Entomologists. [8vo].

This index deals with the whole field of entomological literature published in the U.S.A.

KRANEVELD, F. C., & VAN DER SCHAAF, A. (1937). Een myiasis van de klauwen en hun omgeving bij runderen. [*Cordylobia* **Infestation of the Claws of Cattle**].—*Ned.-ind. Bl. Diergeneesk.* **49.** 360-369. 16 figs. on 4 plates. [5 refs.] [English and German summaries].

The authors describe a myiasis of cattle in North Celebes, also affecting cattle, water-buffaloes and goats in the Philippines, and caused by the larvae of *Cordylobia intonsus*. The part chiefly affected is the skin bordering on the hoofs, and this may lead to infection of the hoof joints. It is stated that in the rainy season, when the animals are allowed to walk through the flooded rice fields, the muddy soil has a healing effect. Treatment of the condition is discussed.

—JAC. JANSEN (UTRECHT).

OSWALD, B. (1938). Revue des travaux publiés en Yougoslavie sur le problème des tiques et nouvelles recherches sur le poison de leurs oeufs. [**Review of Work Published in Yugoslavia on the Tick Problem and Research on Toxins in the Eggs of Ticks**].—*Ann. Parasit. hum. comp.* **16.** 548-559. 3 figs. on 1 plate, 3 tables. [Numerous refs.]

O. describes an outbreak of tick paralysis that occurred in Yugoslavia in 1935; 12 species of ticks have been recorded from that country. It had previously been shown [*V. B.* **9.** 163.] that eggs of *Hyalomma scupense* and *Boophilus calcaratus balcanicus* contained a powerful toxin, and by using a standard emulsion of eggs, O. established the presence of a toxin also in the eggs of *Rhipicephalus bursa* and *Rh. sanguineus*, for which the name "ixovotoxin" is proposed. The toxin is thermolabile, and is not destroyed by 0·2% hydrochloric acid, 0·1% saline, or digestion by pepsin or trypsin. Symptoms produced in g. pigs by the inoculation of this "ixovotoxin" are identical, and the toxins from each species appear to be related. The duration of paralysis produced by the "toxin" is in inverse ratio to the amount inoculated, whilst the loss of body weight of the animal is

proportional to the duration of illness. Bacteriological tests of tick eggs were carried out at the same time, but were not conclusive, since at times a variety of organisms were grown and at other times the plates were sterile. O. considers it unlikely that the " toxin " in the eggs is identical with that in the salivary glands of the ticks, since, under natural conditions, tick paralysis occurs only at intervals, whilst ticks with " toxic " eggs may be found on the animals all the year round.
—M. L. Bingham.

I. Davis, G. E., & Cox, H. R. (1938). **A Filter Passing Infectious Agent Isolated from Ticks. I. Isolation from** *Dermacentor andersoni*, **Reactions in Animals, and Filtration Experiments.**—*Publ. Hlth Rep., Wash.* **53.** 2259-2267. 5 tables. [1 ref.]

II. Parker, R. R., & Davis, G. E. (1938). **A Filter Passing Infectious Agent Isolated from Ticks. II. Transmission by** *Dermacentor andersoni.*—*Ibid.* 2267-2270. [2 refs.]

III. Cox, H. R. (1938). **A Filter Passing Infectious Agent Isolated from Ticks. III. Description of Organism and Cultivation Experiments.**—*Ibid.* 2270-2276. 1 table. [7 refs.]

IV. Dyer, R. E. (1938). **A Filter Passing Infectious Agent Isolated from Ticks. IV. Human Infection.**—*Ibid.* 2277-2282. 1 fig. [5 refs.]

I. Unfed *D.a.* ticks collected near Missoula, Mont., U.S.A. when fed on g. pigs, produced in one case a fatal febrile reaction. The infective agent was passaged by inoculation of spleen, blood and urine ; it was inoculable by all the usual routes, and infective through depilated skin. Infection was maintained through repeated passages in white rats and mice, but died out in rabbits after two or three passages. Chipmunks and ground squirrels were susceptible, but monkeys failed to react in four attempts. Recovered animals were immune to reinfection. The pathological findings in g. pigs were continuous high fever, and splenic enlargement ; subcutaneous or intradermal inoculation resulted also in a local inflammatory exudation.

The infective agent passed through Berkefeld N and W filters, but failed to pass a single Seitz disc. It was resistant to glycerin.

II. The infective agent was transmitted to g. pigs by nymphs which had fed as larvae on a reacting animal, and again by adults resulting from these nymphs. The progeny of females which had fed on a case were also infective both as larvae and as nymphs.

III. When g. pigs reacted after inoculation with bacteria-free filtrates of infected tissue, smear preparations of the exudate or spleen substance showed the presence of rickettsia-like organisms. The agent could not be cultivated on cell-free media, failed to survive more than six sub-cultures on leptospira media, and did not produce angiomatous nodules in inoculated monkeys ; it is concluded, therefore, that it bears no relationship to the bartonella organisms. It could be cultivated indefinitely in tissue cultures originating from Berkefeld N and W filtrates, and throughout the series of passages showed the characteristic rickettsia-like bodies.

IV. A febrile condition in a laboratory worker who had been in contact with the virus is described in detail. An infective agent isolated from this case proved to be morphologically, culturally and immunologically identical with the tick-borne virus described above. G. pigs immune to " Q " fever [*V. B.* **9.** 163 and 544.] were found to be also immune to the human strain of the tick-borne virus, and it is suggested that the two conditions may be identical.—J. MacLeod.

I. Trager, W. (1939). **Acquired Immunity to Ticks.**—*J. Parasit.* **25.** 57-81. 8 figs. on 3 plates, 8 tables. [Numerous refs.]

II. TRAGER, W. (1939). **Further Observations on Acquired Immunity to the Tick *Dermacentor variabilis* Say.**—*Ibid.* 137-139. 2 tables. [2 refs.]

I. Infestation of g. pigs and, in a few instances, of rabbits, with nymphs or larvae of *D.v.* resulted in the animals becoming relatively immune to subsequent infestations with larvae of this species, so that only small numbers of the parasites succeeded in engorging on the now modified hosts, and many of the parasites on such hosts were undersized or light in colour. The immunity was general, *i.e.*, not confined to the area infested; it developed after two weeks and lasted about three months, in g. pigs.

Repeated infestations had no effect on the ability of nymphs or adult females to engorge, but it is suggested that the amount of the blood meals taken was reduced.

A limited number of cross-immunity tests were made between *D.v.*, *D. andersoni*, and *Haemaphysalis leporispalustris* and it is claimed that infestation by each species immunized against that species and the other two. [In view of the wide variation recorded in the numbers which succeeded in attaching to non-immunized g. pigs, the cross-immunity results are of rather doubtful significance].

A natural host of *D.v.*, the deer mouse *Peromyscus leucopus*, did not develop immunity after one infestation of larvae, but after repeated infestations fewer larvae were able to engorge.

The immunity could be induced by intradermal inoculation of emulsified larvae. Intraperitoneal inoculation of immune serum resulted in some slight degree of immunity. Histological examination showed that the mechanism of the immunity was an intensification of the local cellular reaction to tick bite, so that the mouth parts were rapidly walled off from the food supply. It is suggested that this acceleration of reaction is due to circulating antibodies, and the possible nature of the antigen is discussed.

II. The second paper gives the results of immunization by inoculation of different tissues from partially gorged adult ticks. The antigen appears to be present principally in the salivary glands, but also occurs in the cephalic gland and in the digestive tract.

Specific complement-fixation with immune serum could be demonstrated in the case of immunized rabbits, but the test could not be used for g. pigs, since normal complement was fixed by a combination of g. pig serum with tick antigen.

—J. MACLEOD.

GREGSON, J. D. (1938). **Cytoplasmic Inclusion Bodies in the Engorging Tick.** —*J. Path. Bact.* **47.** 143-153. 17 figs. on 2 plates, 1 table. [9 refs.]

A study of the morphological characters and staining reactions of a type of inclusion body in the gut epithelium of *Dermacentor andersoni* ticks. The bodies could not be found in unfed ticks, and appeared first as minute globules during engorgement. As assimilation proceeded, the globules grew in size. Similar bodies were observed in the subcutaneous layer, in phagocytic cells in the haemocoel, and in ova at different stages of development within the tick. Attempts at culture of the bodies were unsuccessful, and no conclusion as to their nature is hazarded.—J. MACLEOD.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

OLDHAM, J. N. (1938). **Changes in the Names of Worms: the Rules of Zoological Nomenclature as Applied to Veterinary Helminthology.**—*Vet. Rec.* **50.** 1131-1138.

O. gives the generally accepted names of 106 different helminth parasites

with their various synonyms. The list comprises 10 trematodes, 22 cestodes, 73 nematodes and one species of *Acanthocephala*. He refers to the *International Rules of Zoological Nomenclature*, as a result of which order is gradually becoming established. Those species in the list which either do not occur, or occur only very rarely, in the British Isles are marked with an asterisk.—A. L. WILSON.

WAGNER, O. (1938). Helminthiasis der Pferde. [**Helminthiasis in Horses**].—*Vet.-med. Nach. Bayer-Meister Lucius.* Suppl. pp. 31-70. 35 figs. on 22 plates. [Numerous refs.]

The life-cycle, symptoms, diagnosis and treatment of the following common parasites of the horse are dealt with :- *Habronema megastoma, H. microstoma* and *H. musca*; *Anoplocephala perfoliata, A. magna*; *Paranoplocephala mamillana*; *Parascaris equorum*; *Strongyloides westeri*; *Strongylus vulgaris, S. equinus, S. edentatus*, and *Oxyuris equi*. Methods of control and treatment are described. In strongyle infestations W. recommends either packing the faeces into heaps with periodic turning over of the pile, the fermentation produced being relied upon to kill the eggs and larvae, or the use of calcium cyanamide to kill the eggs and larvae in the faeces ; as calcium cyanamide contains much nitrogen, it also increases the manurial value of the faeces.—A. L. WILSON.

LE DUC, A. (1938). Les helminthes de l'éléphant d'Asie. [**Helminth Parasites of the Indian Elephant**].—*Thesis, Alfort.* pp. 131. 30 text figs., 13 figs. on 7 plates. [Numerous refs.]

This thesis may be regarded as a text-book on the helminth parasites infesting the Indian elephant, incorporating many published observations as well as personal ones. The morphology of 32 species of parasites and their eggs is described. An autopsy was made on a circus elephant and from it were obtained 35 litres of parasites, mainly trematodes and strongyles. Microscopic examination of the faeces of three other elephants revealed the presence of strongyle and trematode eggs.—A. L. WILSON.

BADANINE, N. V. (1938). Sur la question d'helmintofaune du chameau en Turkmenie. [**Helminth Parasites of the Camel in Turkoman, U.S.S.R.**] —*Livro Jubilar Prof. L. Travassos.* pp. 61-73. 5 figs. on 1 plate. [12 refs.] Rio de Janeiro : Instituto Oswaldo Cruz. [In French].

A list is given of the parasites found P.M. in Bactrian camels and dromedaries between 1928-1937. Worms of the following genera were found :- *Echinococcus spp., Stilesia spp., Moniezia sp., Fasciola sp., Dicrocoelium sp., Trichostrongylus spp., Camelostrongylus sp., Trichocephalus spp., Physocephalus spp., Parabronema sp., Nematodirus sp., Dictyocaulus sp., Chabertia sp., Oesophagostomum spp., Ostertagia spp., Haemonchus sp., Cooperia spp., Thelazia sp.*, and *Onchocerca sp.* The list includes *Onchocerca fasciata* and *Thelazia leesei*, which B. states have not hitherto been seen in the U. S. S. R.

AZIM, A. (1939). Helminthes parasites des chiens et des chats en Égypte. [**Helminth Parasites of Cats and Dogs in Egypt**].—*Ann. Parasit. hum. comp.* **17.** 32-36. 2 tables. [Numerous refs.]

Of 300 dogs captured and killed for examination in Cairo and elsewhere, 95% were parasitized ; all of 150 cats caught in Cairo were parasitized. Usually about four types of parasites were found, mainly in the digestive tract : 90% of the cats and 67% of the dogs had Heterophyidae ; other percentages of infestation were :-

Dipylidium caninum, in 65% of dogs, and 50% of cats; *Taenia hydatigena* in 23% of dogs, and *Echinococcus granulosus* in 10% of dogs and only rarely in cats.

WADOWSKI, S. (1938). Niektóre pasożyty jelit drobiu. [**Intestinal Parasites of Poultry**].—*Pam. pańs. Inst. nauk. Gosp. wiej. Puławy.* No. 2. pp. 105-139. 3 tables, 2 graphs. [Numerous refs.] [French summary]. [Suppl. to *Wiad. weteryn.* **18.** No. 223].

W. examined 200 hens, 100 geese, 55 ducks, 25 pigeons, 23 turkeys and one wild duck; 79% of the hens, 69% of the geese, 51% of the turkeys and 24% of the pigeons were found to harbour parasites. The following parasites were found :– in pigeons, *Ascaridia columbae*; in turkeys, *Brachyalemus commutatus* and *Heterakis gallinae*; in geese, *Weinlandia collaris*, *Hypomenolepis anatina*, *Drepanidotaenia lanceolata*, *Amidostomum nodularis* and *Heterakis dispar*; in ducks, *Echinostomum revolutum*, *Echinoparyphium recurvatum*, *Hymenolepis tenuirostris*, *Ascaridia galli*, *Heterakis dispar* and *Polymorphus boschadis*, and in fowls, *Echinostomum revolutum*, *Amoebotaenia sphenoides*, *Choanotaenia infundibulum*, *Hymenolepis cantaniana* and *H. carioca*, *Raillietina tetragona*, *R. achinobothrida* and *R. cesticullus*, *Ascaridia galli* and *A. lineata*, *Capillaria columbae*, and *Heterakis gallinae*.

BAKER, D. W. (1939). **Survival of Worm Parasite Infection on New York State Pasture.**—*Cornell Vet.* **29.** 45-48. 2 tables. [2 refs.]

An area of normal grazing which had not been pastured for 21 years was contaminated by grazing off the available herbage with six heavily parasitized sheep. After about a year two worm-free lambs were allowed to graze the same area. Faecal examination showed ova within a month, and autopsy revealed infestation with *Haemonchus contortus*, *Ostertagia circumcincta*, *Cooperia curticei*, *Nematodirus spathiger*, *Bunostomum trigonocephalum*, *Moniezia expansa*, *Trichuris ovis*, *Oesophagostomum columbianum*, and *Trichostrongylus sp.* The plot was then vacated for 21 months, and the experiment repeated. Heavy infestation again occurred.

A parallel test with calves showed that *Ostertagia ostertagi*, *Cooperia oncophora*, and *Trichuris bovis* remained viable in pastures for at least nine months.—D. D. O.

LÜHRS, E. (1938). Planmässige Bekämpfung der Leberegelseuche. [**Planned Control of Liver Rot**].—*Tierärztl. Rdsch.* **44.** 41-45. 3 graphs. [3 refs.]

Conventional details are given concerning the treatment of pasture and watering places to control the parasites and their intermediate hosts. Cattle should be treated for distomatosis in August, November and January, and sheep in June, October, and January.—A. L. WILSON.

SRIVASTAVA, H. D. (1938). **A Study of the Life-History and Pathogenicity of** *Cotylophoron cotylophorum* **(Fischoeder, 1901.) Stiles and Goldberger, 1910 of Indian Ruminants and a Biological Control to Check the Infestation.** —*Indian J. vet. Sci.* **8.** 381-385. 11 figs. on 5 plates. [14 refs.]

S. has established experimentally the life-cycle of the parasite in India. Adult amphistomes were obtained from the rumen of sheep and goats and incubated until eggs were laid. When miracidia hatched out of the eggs they were used to infest the snail *Indoplanorbis exustus* raised in the laboratory. The sporocyst, redia and cercaria are described, and it was found that, whereas adult amphistomes were practically non-pathogenic, the immature specimens were markedly pathogenic. An interesting discovery was that when snails infested with the aquatic oligochaete, *Chaetogaster limnaei*, were used they could not be infested with amphistome larvae, but when free from the oligochaete they were readily infested. —A. L. WILSON.

REYES, R. V. (1938). Un trematodo intestinal de los bovídeos (*Zygocotile Lunatum*, DIESING 1836). [*Z.l.* **An Intestinal Trematode of Cattle**].—*Rev. Med. vet., Bogota.* **8.** 4-6. 1 fig. [4 refs.]

This trematode was present in the fourth stomach of a cow. The life-history is unknown ; a description is given of the parasite.

JOYEUX, C., & BAER, J. G. (1937). Evolution du *Taenia taeniaeformis* Botsch. [**Development Cycle of** *T.t.*]—*C. R. Soc. Biol. Paris.* **126.** 359-361. [2 refs.]

A description is given of the larval stage after removal from the cyst. Ripe segments of *Cysticercus fasciolaris* were fed to four young cats and the development of adult parasites at different stages was studied.—A. L. WILSON.

ORTLEPP, R. J. (1938). **South African Helminths. Part II. Some Taenias from Large Wild Carnivores.**—*Onderstepoort J. vet. Sci.* **10.** 253-274. 19 text figs., 11 figs. on 1 plate, 1 table. [8 refs.] [See also *V. B.* **9.** 248].

Seven species of *Taenia*, hitherto unrecorded, are here described, *viz* :– *T. bubesei* and *T. gonyamai* from lions, *T. ingwei* from a leopard, *T. hlosei* and *T. acinomyamai* from cheetahs and *T. jackalsi* and *T. pungutchui* from jackals ; in addition the species *T. multiceps* and *T. sertalis* are recorded from jackals and *T. pisiformis* from a wild dog.

RAEVSKAJA, Z. A. (1937). Opyty po degeljmintizacii vnešneĭ sredy v otnošenii ankilostomidozov i askaridoza sobak. [**The Destruction of the Eggs of Dog Hookworms and Ascarids on the Ground**].—*Papers on Helminthology, Commemorating 30 Year Jubilee of Prof. K. J. Skrjabin.* pp. 560-564. Moscow : Lenin. Acad. Agric. Sci.

R. gives the results of numerous viability tests on the eggs of dog hookworms and ascarids *in vitro* and on the ground, using solutions of phenol, with or without sulphur, and corrosive sublimate. For practical purposes it was found that eggs on the ground could be killed in about three days by copious irrigation with 5% phenol.

BACCI, I. (1939). Le alterazioni del sangue nei polli infestati sperimentalmente con ascaridi. (Heterakis Papillosa ed Inflexa). [**Alterations in the Blood of Fowls Infested Experimentally with** *Heterakis*].—*Nuova Vet.* **17.** 90-95. 1 fig., 3 tables.

Eight fowls were used for this experiment and two were kept as controls. The examination of the blood was begun when eggs began to be recovered from the faeces. The number of R.B.C. was reduced from 3,231,500, the normal figure, to 2,280,000 and even to 2,000,000. This decrease was accompanied by anisocytosis, poikilocytosis and polychromatophilia. The most important variation in the leucocytic ratio was an intense eosinophilic leucocytosis with the occurrence of eosinophile and pre-eosinophile myelocytes. Cells resembling Rieder cells were also often seen. There was also intense thrombocytosis.

The following are the proportions after 150 days from the beginning of the infestation :– R.B.C. per c.mm. 2,280,000, haemoglobin 44%, W.B.C. per c.mm. 38,600, lymphocytes 29%, giant mononuclear leucocytes 6%, immature forms 1%, Rieder cells 7%, polynuclear neutrophiles 16%, eosinophiles 30·5%, pseudo-eosinophiles 10% and basophiles 0·5%. For every 100 leucocytes there were 401 thrombocytes.

CLAPHAM, Phyllis A. (1938). **Are there Host Strains within the Species of** *Syngamus trachea?*—*J. Helminth.* **16.** 49-52. [5 refs.]

C. found that chickens, partridges and pheasants could be readily parasitized by *S.t.* when fed with earthworms containing infective eggs. The larvae were cultured from eggs of *S.t.* obtained from the pheasant, partridge, jackdaw, crow, jay, and magpie. Thus there are apparently no host strains, or, if a physiological difference exists, passage through the intermediate host seems to remove it; hence, wild birds may be important factors in the spread of the disease. As yet, little is known regarding the site of these worms in the trachea of different birds.—M. L. BINGHAM.

LEVINE, P. P. (1938). **Infection of the Chicken with** *Capillaria columbae* **(Rud).** —*J. Parasit.* **24.** 45-52. 1 table. [17 refs.]

Studies on the life cycle of *C. columbae* supported the findings of other authors, whose work is briefly reviewed. Experimental feeding of chickens with *C. columbae* produced loss of weight, emaciation and diarrhoea, associated with a catarrhal enteritis and desquamation of the intestinal epithelium, and in some cases, death. Infection could not be prevented by feeding mashes containing 2% tobacco dust by weight, nor were single doses of carbon tetrachloride or tetrachlorethylene effective in removing the parasites from individual birds. As a control measure, pigeons should be kept away from poultry runs as they can readily transmit the infection to chickens.—M. L. BINGHAM.

BAYLIS, H. A. (1938). **Notes on some Species of the Nematode Genus** *Cooperia* **from Cattle and Sheep.**—*Vet. Rec.* **50.** 283-285. 3 figs. [6 refs.]

C. mcmasteri should be regarded as a distinct species, since the form of the tips of the spicules and the genital cone show constant specific characters. It was originally recorded in a calf in New South Wales, and was recently found there in sheep also. It has more recently been described by B. as occurring in a lamb from North Wales. *C. nicoli* must be regarded as a synonym of *C. pectinata* and *C. fieldingi* as a synonym of *C. punctata*. *C. fieldingi* and *C. curticei* are not synonymous. TRAVASSOS [*V. B.* **9.** 633.] records eleven species of *Cooperia*, eight known to occur in ruminants. To these should be added *C. spatulata* described by B. occurring in cattle and sheep in Malaya and Australia.—L. E. HUGHES.

SPIEGL, A. (1938). Die Magenwurmseuche der Schafe als Aufzuchtkrankheit und die bei der Bekämpfung dieser Seuche im Jahre 1937 gesammelten Erfahrungen. **[Disease in Breeding Sheep and Lambs due to Stomach Worms and its Control in 1937]**.—*Dtsch. tierärztl. Wschr.* **46.** 777-779.

Wide-spread infestation with stomach worms had been a severe handicap to sheep-breeding in Saxony, causing, in addition to actual deaths, retarded development of young animals, birth of weakly lambs, poor wool production, etc. An extensive campaign was launched against these parasites. In 338 flocks there was clinical evidence of disease. 9,000 samples of faeces were examined, and 80,000 sheep were dosed. Eggs and larvae of stomach-worms were detected in 73% of faecal examinations, and in about half of these in such numbers as to indicate a heavy infestation of the flock. The principal cause of disease was *Haemonchus contortus*, *Trichostrongylus* and *Ostertagia* species being less frequently found. Lungworm larvae were detected in 11·6% of samples, tapeworm eggs in 7·6%, and fluke eggs in 0·3%.

The anthelmintic chiefly used was a commercial preparation (Sprehn's tablets); details of dosage are not given. Dosing was repeated three times at four-weekly

intervals in heavily infested flocks. Results, on the whole, were good, and losses were considerably diminished.—H. E. HARBOUR.

MALYGIN, S. A. (1937). Anatomija i morfologija vidov roda Strongyloides (Grass, 1879) domašnih zivotnyh. [**Anatomy and Morphology of the *Strongyloides* of Domestic Animals**].—*Papers on Helminthology Commemorating 30 Year Jubilee of Prof. K. J. Skrjabin.* pp. 388-395. 5 tables. Moscow: Lenin Acad. Agric. Sci.

The article describes *Strongyloides spp.* of domestic animals:—*S. westeri*, *S. papillosus* and *S. suis*. The differential morphology of the species enumerated are described.

COPPINI, R. (1938). L'acuariosi (o disfaragosi) dei polli in Umbria. [*Acuaria hamulosa* **Infestation in Fowls**].—*Nuova Vet.* **16.** 312-316. 3 figs. [German summary].

Infestation with *A.h.* has been observed in fowls, pigeons, peacocks, geese, ducks, and swans. The larvae develop in the muscular tunic of the gizzard. Symptoms are lassitude, increasing emaciation, and general cachexia in spite of a good appetite; death follows in five or six weeks. Diagnosis is difficult in the living subject, but easy on P.M. examination. Affected birds can be treated with essence of turpentine in gelatine capsules. C. found that there were usually no lesions except in the digestive organs, especially the gizzard, but in the case of one fowl he found the liver and spleen seriously diseased.—S. F. J. HODGMAN.

TRUONG-TAN-TGOC. (1937). Filariose du canard domestique en Cochinchine due à *Oshimaia taiwana* (Sugimoto 1919). [**Filariasis of the Domestic Duck in Cochinchina due to** *O.t.*]—*Bull. Soc. Path. exot.* **30.** 775-778. [5 refs.]

T. describes the seasonal incidence of the parasite in young domestic ducks, and also deals with the susceptibility of various breeds of ducks to infection. The condition first manifests itself as a tumour under the lower mandible. The tumour contains the parasites and if not removed may cause death of the bird by asphyxia and inanition. Prophylactic treatment and symptoms are described.

—A. L. WILSON.

IMMUNITY

GADOLA, A. (1938). La intrapalpebrotubercolinizzazione nei bovini. [**The "Intrapalpebral" Tuberculin Test in Cattle**].—*Clin. vet., Milano.* **61.** 1-23 and 59-82. 10 figs. on 4 plates, 15 tables. [17 refs.]

In Italy, the method most commonly used for the detection of tuberculous animals is the subcutaneous test. G. considers that the value of the "intrapalpebral test" is not sufficiently recognized, and he gives details of tests carried out on 1,507 bovines; 89·79% of those which reacted showed macroscopic lesions, but G. was not able to perform g. pig inoculation tests on those from which lesions were absent.

During these experiments the relative value of various makes of tuberculin was tested, and it is stated that Petragnani's synthetic tuberculin gave the best results.—A. J. CASSAR.

SMITHBURN, K. C., & SABIN, Florence R. (1938). **Reactions of Normal and Tuberculous Animals to Tuberculo-Protein and Tuberculo-Phosphatide.**—*J. exp. Med.* **68.** 641-658. 5 figs. on 1 plate, 4 tables. [Numerous refs.]

Previous studies on cellular reactions to tuberculo-phosphatide are reviewed. Inoculation of tuberculo-phosphatide into normal g. pigs produced in 3-4 days a firm erythematous nodule which did not ulcerate and which disappeared leaving no scar. Microscopically there was migration of neutrophiles and proliferation of monocytes. In g. pigs experimentally infected with TB. the reaction was hastened and necrosis of the tissues followed. The histological changes were similar in nature to those in normal animals but were accentuated. Epithelioid cells were predominant.

Tuberculo-protein produced no macroscopic reaction in normal animals. There was a neutrophilic and monocytic reaction ; epithelioid cells did not appear. In tuberculous animals there was a rapid and marked local reaction to tuberculo-protein which increased in size until the fourth day and then regressed. There was haemorrhage, necrosis and tissue degeneration accompanied by infiltration of neutrophiles and monocytes. Giant cells and epithelioid cells were present.

Tuberculo-phosphatide did not hypersensitize animals to tuberculin, but repeated injections of tuberculo-protein into normal animals invoked a mild hypersensitivity to subsequent injections of tuberculin.—J. REID.

I. THAYER, J. D. (1938). **Further Studies on Methods of Desensitization of Tuberculous Guinea-Pigs.**—*Tubercle, Lond.* **19.** 313-322. 5 tables. [18 refs.]

II. THAYER, J. D. (1938). **Desensitization in the Treatment of Tuberculous Guinea-Pigs.**—*Ibid.* 365-374. 7 tables, 1 graph. [14 refs.]

I. This article records attempts to estimate the value as desensitizing agents of various tuberculins and of tubercle bacilli killed by different methods. The methods of preparation of the antigens are described.

Bacilli killed by ether, chloroform or nitrous acid were equally efficacious in producing desensitization of experimentally infected g. pigs, but the inoculation of the materials so obtained caused large sterile abscesses at the site of injection. Tuberculin and glycerol extract of tubercle bacilli sensitized by immune serum were found to be of equal desensitizing value. Treatment with tuberculin precipitated by trichloracetic acid was more effective in desensitizing than was administration of old tuberculin.

II. The effect of tuberculin precipitated by nitrous acid was comparatively low in toxic action and this antigen had a correspondingly reduced desensitizing value. Synthetic medium tuberculin was shown to give the best results of any antigen used. Tuberculin precipitated by trichloracetic acid was a more powerful desensitizing agent than was the purified protein derivative.

Daily increasing doses of all antigens tried were more effective in producing desensitization than were doses increased weekly.

A virulent strain of bacilli caused a too rapid progression of disease to permit differences in treated and untreated animals to be demonstrated.—J. REID.

EHRLICH. (1937). Die Frischmilchschnellagglutination zum Nachweis der Abortus-Bang-Infektion. [**Rapid Milk Agglutination Test for Diagnosis of Bovine Contagious Abortion**].—*Z. InfektKr. Haustiere.* **52.** 163-179. 2 figs., 5 tables. [13 refs.]

A report of a critical comparison of the rapid slide and slow tube agglutination tests for the presence of *Brucella abortus* antibodies in milk. Over a series of 1,044 samples the two tests were in agreement only in 74% of instances. It is concluded

therefore that the rapid slide test is not suitable for replacing the ordinary slow tube method.—E. J. PULLINGER.

FEDELI, A. (1938). Sulla standardizzazione del metodo di agglutinazione nella diagnosi delle brucellosi animali. [**Standardization of the Agglutination Test for Brucella**].—*Profilassi.* **11.** 81-87. [French and German summaries].

F. discussed the proposals made for the standardization of the agglutination test, with particular reference to those recently made at a meeting of the Office International des Epizooties [see *V. B.* **8.** 163].

I. MEINICKE, E. (1938). Zur Technik meiner Bruzellose-Flockungsprobe: M.B.F. (Zentrifugierverfahren). [**Technique of the Meinicke Flocculation Test for Brucellosis**].—*Dtsch. tierärztl. Wschr.* **46.** 177-179. 1 table. [1 ref.]

II. MEINICKE, E. (1938). Meine Bruzellose-Flockungsprobe (M.B.F.) als Sedimentier oder Kuppenmethode. [**The Meinicke Reaction as a Sedimentation Method**].—*Ibid.* 193-197. [11 refs.]

I. A report of modifications of the standard Meinicke-Klärung test for contagious abortion which are claimed to increase the sensitivity and reliability of the test. Modifications include a method of determining by titration, the optimum amount of *Br. abortus* antigen to add to the Meinicke-Klärung extract. A further safeguard is the introduction of an alkaline broth control.

II. A report of further modifications of the above test in which centrifugation of the tests is omitted, and instead they are allowed to deposit sediment overnight at room temperature. The results obtained by this simplified technique are claimed to be as satisfactory as those obtained by centrifugation.—E. J. PULLINGER.

SCHEIBE, H. (1939). Fehlerquellen bei der Langsamagglutination auf Brucella bovis. [**Sources of Error in the Slow Agglutination Test for Bovine Brucellosis**].—*Dtsch. tierärztl. Wschr.* **47.** 34-38. [11 refs.]

A discussion of those technical errors which may interfere with the ordinary tube agglutination test for bovine contagious abortion. S. concludes that the most serious difficulty encountered is the growth of contaminating bacteria in the test fluids during incubation; this can be eliminated, however, by including a preservative such as chinosol in the diluent. [Other important factors not mentioned are the use of unstandardized antigen and the preparation of antigen from rough or semi-rough strains of *Br. abortus*].—E. J. PULLINGER.

GRYCZ, E., SOŁTYS, M., TEKLIŃSKI, A., & ZYLBERTAL, S. (1938). Badania porównawcze w rozpoznawaniu Brucella bovis odczynami—aglutynacji, wiązania dopełniacza i alergicznym. [**Comparative Study of the Diagnosis of *Br. abortus* Infection by the Agglutination, Complement-Fixation, and Allergic Tests**].—*Pam. pańs. Inst. nauk. Gosp. Wiej. Puławy.* No. 2. pp. 37-44. 6 tables. [12 refs.] [French summary]. [Suppl. to *Wiad. weteryn.* **18.** No. 223].

For the allergic test, the authors used " Brucellin P ", which is said to be similar to Dubois's brucellin, except that a minimal amount of " R " strain material (amount not given) from a growth on liver agar is added. It was found that the serological and allergic tests disagreed in about 60% of cases. The authors are continuing their experiments.

LEHNERT, E. (1938). Sero-och bakterioterapien i veterinärmedicinen. [**Serum and Vaccine Therapy in Veterinary Medicine**].—*Svensk VetTidskr.* **43.** 384-407.

A general account of the subject.—GUSTAV NAERLAND (OSLO).

DISEASES, GENERAL

PEGREFFI, G. (1937). Le malattie infettive che dominano in Sardegna ed i mezzi per combatterle. [**Animal Diseases in Sardinia**].—*Azione vet.* **6.** 854-858.

The chief diseases of animals in Sardinia are discussed, and methods of control suggested. The most important infections are :– mastitis in cattle, sheep and goats ; enterotoxaemia, and other anaerobic infections ; foot-rot ; contagious pustular stomatitis, and contagious pustular dermatitis.

PETROVIĆ, D. M. (1938). Da li je objašnjena etiologija apoplektiformnih uginjavanja ovaca u Jugoslaviji ? [**The Aetiology of Sudden Death of Sheep in Yugoslavia**].—*Jugoslov. vet. Glasn.* **18.** 504-513.

P. discusses sheep diseases associated with short illness in Yugoslavia, with special reference to anaerobic diseases. He also draws attention to the recently recorded losses of sheep due to acute liver fluke infestation.—B. OSWALD (KRIŽEVCI).

WIELAND, G. (1937). Consideraciones acerca de la explotación y producción del ganado ovejuno en el Departmento de Huancavelica. [**Sheep Raising in Huancavelica, Peru (with Notes on Diseases)**].—*Cart. Direc. Agric. Peru.* No. 31. pp. 31. 3 figs. [10 refs.]

This comprehensive pamphlet deals with the systems of pasturage, and with the shearing, dipping, and cross-breeding of sheep, and their diseases and wool-bearing properties in the Department of Huancavelica, Peru.

Change of pasture occurs three times yearly ; flocks are grazed on fenced pastures which are burned every fifth year and subsequently re-sown with a mixture rich in white clover and rye-grass.

Notes are included on lamb dysentery and worm infestations.—J. PASFIELD.

BARBONI, E. (1938). Studio di una infestione da trichuris in nutrie (Myocastor coypus) morte di colibacillosi. [**Trichuris Infestation and *Bact. coli* Infection of Nutria**].—*Nuova Vet.* **16.** 67-72. 2 figs., 1 table.

B. discusses the systematic place of *Trichuris* among the nematodes. He describes lesions found in two dead nutria sent to the Institute of Veterinary Pathology, Perugia. The intestines and caecum were found to contain *Tr. leporis.* *Bact. coli* was isolated from lesions in the spleen, and from blood, heart and kidneys. The cause of death was not ascertained.

WALDHELM, R. (1937). Untersuchungen über den Harnstoff-gehalt des Speichels bei gesunden und nierenkranken Pferden. [**Urea Content of the Saliva of Healthy Horses and of those Affected with Kidney Disease**].—*Inaug. Diss., Hanover.* pp. 38. 1 table, 1 chart.

The urea content of the saliva and blood of 23 horses with no symptoms of kidney disease was estimated by titration with 5% mercuric sublimate solution. A flow of saliva was produced by injecting 1 c.c. of lentin. The average figure for unfiltered saliva was 57 mg.% (variation 44·4-74 mg.%), for filtered saliva 55·9 mg.% (variation 45·6-73 mg.%) and for protein-free saliva 51·1 mg.% (variation

39-64 mg.%). The average figure for blood urea was 45·8 mg.% (variation 28·66-56 mg.%). In one case the blood urea was higher than the saliva urea; this is considered to be due to excessive salivation after the injection of lentin.

In four cases of nephritis there was an increased content of urea in the saliva, unfiltered saliva containing 98·4-100·2 mg.%. In another case, a horse which gave an excessive response to lentin, the urea was within normal limits although albumin was present in the urine. One case showed no significant increase.
—A. T. PHILLIPSON.

WEBSTER, W. M. (1936). **Contagious Ophthalmia in Sheep.**—*Proc. Ann. Meet. Sheep. Fmrs, N.Z., 1936.* pp. 79-83.

Contagious ophthalmia of sheep can be a serious problem. In New Zealand it usually appears in late summer or early autumn, and most of the members of an infected flock become involved. It is characterized by photophobia, conjunctivitis, corneal opacity, irido-cyclitis, and excessive lachrymation. In severe cases proptosis and keratocoele often follow. The condition is bilateral and causes temporary blindness, but there is comparatively little constitutional disturbance. Recovery occurs spontaneously within 14-21 days, but is assisted by the instillation of 10% "argyrol" into the eyes. A natural attack of the disease confers a moderately solid and lasting immunity. Rickettsia have been incriminated as the probable cause of the condition [*V. B.* **6.** 122.], but the method of transmission has not yet been established.—D. D. OGILVIE.

LANFRANCHI, A., & SEREN, E. (1938). Ricerche su la trasmissione sperimentale e su la immunizzazione nella papillomatosi cutanea dei bovini. [**Transmission of and Immunization against Skin Papilloma in Cattle**].—*Nuova Vet.* **16.** 32-43. 24 text figs., 2 figs. on 2 plates, 2 tables.

After a brief reference to the work done by other authors proving the contagious nature of papillomata from bovine to bovine and to man, the authors describe their personal experiments and conclusions. By applying a few c.c. of an emulsion of warts obtained from a naturally infected calf to a scarified abdominal area in a calf, they succeeded in making four passages in series. In the first three passages both local and diffuse lesions, similar to natural papillomata, were obtained, while in the fourth passage the lesions were only localized. The authors next tried to immunize animals, using homologous as well as heterologous material, the latter consisting of Rous sarcoma of fowls. The immunity due to sarcoma was far inferior to that produced by papillomata.—A. J. CASSAR.

PIEPENSTOCK, H. (1937). Histologische Untersuchungen der regionären Lymphknoten des Schweines im Verlauf von Knockenbrüchen in differential diagnostischer Hinsicht ähnlicher Veränderungen bei Virusschweinepest. [**Histological Examinations of Regional Lymph Nodes of Swine with Bone Fractures, with regard to Similar Changes in Swine Fever**].—*Inaug. Diss., Hanover.* pp. 35. 2 tables. [14 refs.]

Considerable attention has been paid by several workers to the haemorrhagic character of the lymph nodes in S.F. From a histological study of the lymph nodes draining areas involved in fractures in 20 pigs, P. clearly distinguishes between the histological features of simple blood resorption following injury and the specific regressive changes observed in S.F. For a diagnosis of the latter disease it is necessary to consider the clinical history and P.M. findings and, wherever possible, to carry out a histological examination. A haemorrhagic condition of one or more lymph nodes is not uncommon in pigs, and, he states, is not necessarily associated with the presence of swine fever.—E. G. WHITE.

BLOUNT, W. P. (1939). **Haemocytoblastosis.**—*Vet. J.* **95.** 91-102.

EMMEL's work on the aetiology of fowl paralysis, leucaemia, and allied conditions in animals [*V. B.* **8.** 793.] is discussed. B. made an attempt to confirm it in the British Isles.

A comparison of the blood picture in ten chicks with caecal coccidiosis with that in an equal number in which the small intestine was involved showed leucocytosis to be characteristic in the former, whereas in the latter there was a definite leucopenia. This is contrary to the experience of EMMEL, who found that leucocytosis invariably accompanied haemocytoblastosis. Nor, in the cases studied by B., did the degree of haemocytoblastosis bear direct relationship to the disease condition, to which it is suggested that it is most probably merely a sequel.

Twenty-four cases of F.P. were also examined. Haemocytoblastosis did not appear to be an essential factor of the disease, advanced features of this condition being observed in only two cases of F.P., and no signs at all in 14. In addition, haemocytoblastosis was observed in healthy one-day-old chicks, in pullets following injections of liver extract, and during diseases due to viruses, bacteria, and protozoan parasites.

B. observed all stages between the typical haemocytoblastosis picture reported by EMMEL and the normal picture. He considers, therefore, that haemocytoblastosis is merely a myeloid response, and not a disease in itself.—D. D. OGILVIE.

FRASER, A. H. (1938). **Biological Factors Involved in the Problem of Poultry Mortality.**—*Harper Adams Util. Poult. J.* **23.** 317-327. [6 refs.]

F. describes an outbreak of disease which he believes to have been fowl paralysis although it was not confirmed by P.M. examination.

In a preliminary isolation experiment, the death rate from fowl paralysis in day-old chicks reared on clean ground under conditions of partial isolation was 0·89%, compared with 14·01% in the control flock.

A further experiment, although not completely successful due to the introduction of coccidiosis, gave further proof of the value of isolation as a control measure. F. speculates on the possibility of an infective agent as the cause of fowl paralysis.—J. E. WILSON.

SCHMID, E. (1937). Beziehung des Keimgehaltes bebrüteter Eier zur Nabelinfektion bei Kücken. [**Connexion between Bacterial Content of Hatching Eggs and Navel Infection in Chicks**].—*Inaug. Diss., Munich.* pp. 31. 7 tables. [20 refs.]

S. states that his investigations indicate that navel infection which frequently kills chicks during the first nine days from hatching, is caused by a number of bacteria (*Bact. coli*, staphylococci, diplococci, and others) commonly present in eggs that have failed to hatch and in chicks that died before hatching. The trouble might be controlled by the selection of resistant lines of hens, and by strict sanitation of the hatcheries.

DARRASPEN, E., FLORIO, R., & MEYMANDI, M. H. (1939). Des modifications humorales dans certaines variétés de tumeurs oculaires, cérébrales et viscérales, chez les équidés, et les carnivores domestiques. Déductions pathogéniques et cliniques. [**Humoral Modifications in Certain Varieties of Ocular, Cerebral and Visceral Tumours in Equines and Domestic Carnivores**].—*Rev. Méd. vét., Toulouse.* **91.** 65-92. [Numerous refs.]

A review is given of previous work dealing with the relation of neoplasms to tissue metabolism, with special reference to the cholesterol, glucose, polypeptide

and urea content of the blood and the alkali reserve of the plasma. The authors have attempted to assess the significance of the level of these substances in the diagnosis and prognosis of certain animal tumours.

On the basis of the finding of a high blood cholesterol in a single case of " cholesteatoma " of the lateral ventricles in a horse, the authors stress the diagnostic importance of cholesterol estimation in this disease. [Evidence based on a single case would hardly appear to warrant a generalization and, in addition, the " cholesteatoma " is now generally regarded merely as a granulomatous mass containing a large amount of cholesterol and not as a neoplasm].

The only other finding of interest is that a high polypeptide content of the blood indicates excessive proteolysis resulting from a large tumour and points to an unfavourable prognosis.—E. G. White.

Dawson, E. K., Innes, J. R. M., & Harvey, W. F. (1938). **Debatable Tumours in Human and Animal Pathology. V. Giant-Cell Tumour of Bone.**—*Edinb. med. J.* **45.** 491-504. 1 text fig., 45 figs. on 4 plates. [Numerous refs.] [See also *V. B.* **8.** 791].

The giant-cell tumour of bone is a highly cellular neoplasm, osteogenic in character, and composed typically of two types of cell—multinucleated giant cells and polyhedral or fusiform cells. A large number of synonyms include myeloid tumour, myeloma, osteoclastoma, giant-cell sarcoma, giant-cell epulis, etc. The tumour may recur after removal, but rarely gives rise to metastases.

It is suggested that trauma and haemorrhage are concerned in the production of these neoplasms, which are in the nature of an osteogenic tissue reaction and proliferation which may ultimately regress, but which, in rare cases, acquires the characters of an osteogenic sarcoma. It is thus probably intermediate in character between reactive tissue and true neoplasia. Of the 117 tumours studied, all but two were from human material.—E. G. White.

Blanchard, L., Poisson, J., & Drieux, H. (1939). Pathologie comparée des tumeurs du thymus. Son intérêt pour l'histogénèse. [**Comparative Pathology in Histogenesis of Thymus Tumours**].—*Rec. Méd. vét.* 115. 129-153. 15 figs. [8 refs.]

A review of the literature dealing with the thymus in animals is followed by a histological account of ten tumours of this gland (four in the horse, one each in a sheep, calf, pig and dog, and two in rabbits). The structure of the neoplasms was so varied as to render an adequate summary of the findings impossible. Both benign and malignant tumours were encountered. A constant finding was groups of epithelial cells in varying stages of differentiation, together with small spaces lined by columnar or cubical epithelium, and occasional Hassal's corpuscles. The points of distinction between true thymus neoplasms and lymphomata or lymphosarcomata arising from lymphoid tissue are discussed. A suitable classification of the tumours is promised in a subsequent paper.—E. G. White.

Berge, B. (1937). Sarkomatose und Lymphosarkomatose bei je einem Hund. [**Sarcomatosis and Lymphosarcomatosis in Dogs**].—*Inaug. Diss., Hanover.* pp. 48. 1 table. [Numerous refs.]

B. gives a useful review of the statistics from many countries dealing with the incidence of neoplasms in the dog. He also describes in detail two unusual cases observed during 1936, discussing in each the literature relating to the particular condition.

The only feature of interest in the first case is the wide-spread metastases—

in adrenals, liver, spleen, lungs, prostate and fourth rib—of a round cell sarcoma which is considered to have arisen in the kidney. The description given of the second case as lymphosarcomatosis of various organs and lymph nodes would seem to place it in the category of " lymphocytoma " as used by FELDMAN [(1930). *J. Amer. vet. med. Ass.* **77.** 294]. [Other names given to similar conditions in dogs include Hodgkin's disease, pseudo-Hodgkin's disease, pseudo-leucaemia, etc. In view of recent advances in the classification of related conditions in human pathology, some attempt to classify these conditions in animals would be of considerable use in avoiding confusion of nomenclature and in assisting diagnosis and prognosis].—E. G. WHITE.

BALL, V., & GIRARD, H. (1936). Les circumanalomes bénins et les circumanalomes malins. [**Benign and Malignant Tumours of the Circumanal Gland**]. —*Rev. Méd. vét., Toulouse.* **88.** 545-556. 7 plates.

The term " anal glands " is frequently employed incorrectly to indicate any or all of the glandular structures related to the anus in the dog. This paper describes the structure of the various glandular organs under the terms "circumanal glands ", which surround the anus and from which neoplasms most often arise ; " external anal glands " or glands of the anal sacs, which are a pair of saccular structures one on each side of the anus, in the wall of which are numerous glands, and the " internal anal glands ", a series of 12-15 lobules opening into the anus and visible only in histological sections.

Neoplasms of the circumanal glands are commoner in male dogs than in bitches, and are most frequently found in animals between the ages of 6 and 13 years. Benign and malignant neoplasms occur, the former being more common. Three types of adenocarcinoma are described, but no account is given of their clinical features or macroscopic appearance.—E. G. WHITE.

PARSONS, D. L. (1936). **Blood Changes in Mice Bearing Experimental Sarcomas : (a) Sarcomas Induced by a Derivative of 1:2:5:6-Dibenzanthracene ; (b) Sarcomas Produced by Cell-Free Filtrates of Mal. Sarcoma 1.**—*J. Path. Bact.* **43.** 1-22. 12 text figs., 16 figs. on 9 plates, 5 tables. [4 refs.]

P. refers to the work of COOK [(1931). *J. chem. Soc.* 3277.] who injected the water-soluble compound sodium 1:2:5:6-dibenzanthracene-9:10-endo-$\alpha\beta$-succinate into mice subcutaneously, and produced sarcomata. Subsequently it was noticed that mice grafted with this sarcoma showed a leucaemic state of the blood ; as this was not observed until the fourth generation, and might have been due to a mouse of a leucaemic strain having been used, P. undertook further experiments to decide whether or not this leucaemic condition was connected with the chemically-produced sarcoma.

A series of nine sarcomata was produced in mice by subcutaneous injection of the same compound. In the treated mice there took place an increase in total leucocytes roughly proportional to the growth of the tumour, an increase in the numbers of myeloid cells, a rapid reversal of the normal relationship between polymorphs and lymphocytes, and an increase of size in the polymorphs associated with abnormal subdivision of the nucleus. Successive grafted generations from these tumours gave similar results ; other effects were the enlargement and myeloid change of the spleen, infiltration round the portal tracts of the liver, cellular changes in the bone-marrow, and atrophy of the male genitalia.

The cell-free filtrate of the first of the sarcomata which P. produced by injection gave rise to a sarcoma at the site of injection in five mice ; these sarcomata were markedly active and easily reproduced, giving the same clinical picture as the primary tumours and cellular grafts.

NUTRITION IN RELATION TO DISEASE

CHAMBERS, W. H. (1938). **Undernutrition and Carbohydrate Metabolism.**—*Physiol. Rev.* **18.** 248-296. 4 tables. [Numerous refs.]

This is an extensive review of the literature dealing with carbohydrate metabolism in under-nutrition. An attempt has been made to correlate under-nutrition studies and endocrine research. The general conclusion arrived at is that experimental work in under-nutrition has modified the conceptions of the conditions regulating carbohydrate metabolism. The studies also emphasize the importance of the dietary supply of carbohydrate in the treatment of diseases involving deficient carbohydrate metabolism.—N. J. SCORGIE.

ROSS, I. C., CHAMBERLIN, W. E., & TURNER, Helen N. (1937). **The Influence of Improvement of Pastures and Rotational Grazing on Parasitism, Body Weight, and Fleece Production in Crossbred Sheep in Tasmania.**—*J. Coun. sci. industr. Res. Aust.* **10.** 313-326. 2 tables, 2 graphs. [2 refs.]

Three experiments are recorded. In the first, cross-bred lambs maintained on improved pasture at the rate of one sheep to $\frac{2}{3}$ acre made significantly better gains in body weight, produced approximately 2 lb. more greasy fleece per head, more fleeces with a lower spinning count but of superior quality and handle, and fewer tender fleeces, than similar lambs maintained on natural pasture at the rate of one sheep to $1\frac{2}{3}$ acres. Sheep on natural or improved pastures made greater body weight gains and produced heavier fleeces when drenched monthly with carbon tetrachloride than when undrenched.

In the second experiment, lambs which failed to develop satisfactorily when weaned on to natural pasture did not make good this early failure when transferred to improved pasture during the second year of life.

In the third experiment, the beneficial effects on body weight, fleece production and parasitic infestation of monthly and weekly rotation of animals through four pastures, as compared with continuous grazing on similar pastures, was clearly demonstrated. Parasitism was characterized by a predominance of the smaller trichostrongyles with a lesser proportion of *Chabertia ovina*, and *Oesophagostomum venulosum*. *Haemonchus contortus*, though present, was unimportant.—H. B. C.

HAHN, P. F., & WHIPPLE, G. H. (1939). **Hemoglobin Production in Anaemia Limited by Low Protein Intake. Influence of Iron Intake, Protein Supplements and Fasting.**—*J. exp. Med.* **69.** 315-326. 4 tables. [7 refs.]

It has previously been shown that when the reserve store of iron in the body is removed, the production of new haemoglobin in dogs made anaemic by loss of blood is limited by the intake of iron in the food. The experiments here reported were designed to see whether the production of haemoglobin in anaemic dogs is similarly limited by the protein intake of the animal even if excess of iron is available. Anaemic dogs were kept on a low protein diet with a high iron content and the total circulating haemoglobin was estimated over periods of months. It was found that dogs on a low protein diet were unable to produce the usual amount of globin and consequently haemoglobin. When excess iron was given by the mouth or intravenously additional haemoglobin was not produced. The protein of salmon, banana and carrot was well utilized, 7-8 g. being required to produce 1 g. of haemoglobin. The experiments showed that the iron content of the liver is not wholly responsible for the potency of liver extract when given in anaemia due to haemorrhage.—A. T. PHILLIPSON.

JONES, J. H. (1938). **The Metabolism of Calcium and Phosphorus as Influenced by the Addition to the Diet of Salts of Metals which Form Insoluble Phosphates.**—*Amer. J. Physiol.* **124.** 230-237. 2 tables. [14 refs.]

Experiments with rats on a stock diet to which was added known concentrations of various salts of Al, Be and Sr (which form insoluble phosphates) produced marked rickets with an accompanying low serum P. Large doses of irradiated ergosterol (vitamin D) either prevented or cured the condition although normal calcification did not occur. The addition of these metals to the diet did not decrease the toxicity of large doses of irradiated ergosterol.—ALFRED EDEN.

UNDERWOOD, E. J. (1938). **Enzootic Marasmus: The Cobalt Content of Soils, Pastures and Animal Organs.**—*Aust. vet. J.* **14.** 183-189. 4 tables. [12 refs.]

Cobalt determinations on a number of soils and pastures from healthy areas and areas where sheep and cattle become affected with enzootic marasmus have been made. Similar observations have been made on the livers of " healthy " and affected sheep.

The mean cobalt content (air-dry basis) of surface soils from " affected " farms was 0·6 p.p.m.; of soils from adjacent healthy areas, 5·6 p.p.m., and of soils from distant healthy areas 10·4 p.p.m. That of " affected " pastures was 0·04 p.p.m. in dry matter, and of healthy pastures 0·16 p.p.m. Large increase in the cobalt content of typical " affected " pasture was obtained by top-dressing with cobalt acetate.

The mean cobalt content of livers from ten " affected " sheep was 0·06 p.p.m. and from healthy sheep 0·28 p.p.m. The results are considered to support the hypothesis that enzootic marasmus is due to a deficiency of cobalt in the diet.
—H. B. CARTER.

EVELETH, D. F., & MILLEN, T. W. (1939). **High Serum Magnesium Associated with Urinary Calculi in Sheep.**—*Vet. Med.* **34.** 106-107. 1 fig. [3 refs.]

A normal quantity of Ca (9·4-10·8 mg.%) and a high Mg content (5·6-6·5 mg.%) were found in the blood serum of two lambs which had shown symptoms of ruptured bladder. Nineteen lambs in the flock had died with this complication within 35 days as a result of urinary calculi. The chemical composition of the food upon which the flock had subsisted for the previous month was assumed to be that of the average of its kind and so to be relatively low in Ca and decidedly high in Mg. It was thought probable that the calculi resulted from an unbalanced mineral diet.
—G. WILLIAMSON.

LESAGE, J. (1938). Au sujet de l'acide phosphorique du sol. [**On the Phosphoric Acid of the Soil (Relation to Disease Resistance)**].—*Bull. Acad. vét. Fr.* **11.** 451-456.

L. claims that resistance to certain diseases is related to acid-soluble P in the soil. [The manner of presentation and evidence provided do not carry conviction concerning the particular claims made].

STEINER, M., ZUGER, B., & KRAMER, B. (1939). **Production of Renal Calculi in Guinea Pigs by Feeding them a Diet Deficient in Vitamin A.**—*Arch. Path.* **27.** 104-114. 4 figs. [Numerous refs.]

In 9 out of 35 g. pigs renal and ureteral calculi were produced by the feeding of a diet deficient in vitamin A; control g. pigs did not develop calculi. The sequence of histological changes observed in the urinary tract was hyperplasia, then metaplasia, and finally atrophy of the pelvic and ureteral mucosa. Large plaques of desquamated epithelium acted as foci for the development of calculi.

The calculi were formed mainly of calcium carbonate. There was no gross or histological evidence of infection in the urinary tract, but this was not tested by bacteriological methods. Similar histological changes were present in the trachea and lungs, and terminal pneumonia was a common sequel.—N. J. SCORGIE.

PETERS, R. A., & O'BRIEN, J. R. (1938). **The Vitamin B Group.**—*Ann. Rev. Biochem.* **7.** 305-324. 1 table. [Numerous refs.]

A review dealing with the vitamin B_1 and B_2 complex. Recent literature dealing with cocarboxylase (an ester of vitamin B_1) and carbohydrate metabolism, chemistry and determination of vitamin B_1, and the requirements of micro-organisms for vitamin B_1 is discussed. Reference is made to the still confused state of vitamin B_2 nomenclature, and to recent work on the requirements of monkeys, pigs, dogs and chicks under experimental conditions for the various factors of the B_2 complex.—N. J. SCORGIE.

KALAJA, L., & NÄRVÄNEN, R. (1938). **A Study of the Factors Which Cause the Heart Disturbances in Vitamin-B Deficiencies.**—*Skand. Arch. Physiol.* **79.** 303-312. 4 figs. [15 refs.] [In English].

The method of experiment adopted by the authors was to inject into rabbits, pigeons and rats such metabolic products as are known, or might be expected, to occur in the body in increased quantities during vitamin B_1-deficiency. The function of the heart was followed by the electro-cardiograph. It was found that in rats large injections of lactic, pyruvic and α-keto-glutamic acids and adenosine compounds caused a vagus-independent sinus bradycardia, similar to that of human beri-beri. In rabbits and pigeons, these substances had no distinct retarding effects on the heart, even when injected in large doses. On the basis of their data the authors conclude that the bradycardia occurring in rats in vitamin B_1-deficiency is caused, at least in part, by an increase of the content of lactic, pyruvic and α-keto-glutamic acids in the blood, and that these substances are not associated with the heart block in vitamin B_1-deficient pigeons.—N. J. SCORGIE.

CHICK, Harriette, MACRAE, T. F., MARTIN, A. J. P., & MARTIN, C. J. (1938). **The Water-Soluble B-Vitamins other than Aneurin (Vitamin B_1), Riboflavin and Nicotinic Acid Required by the Pig.**—*Biochem. J.* **32.** 2207-2224. 2 figs., 3 tables. [Numerous refs.]

Pigs were fed on a synthetic basal diet which allowed optimum growth when 4% of yeast was added to it. When the yeast was replaced by aneurin, riboflavin and nicotinic acid, growth ceased after 3-5 weeks, but on the addition of either the eluate or the filtrate fraction of Edgar and Macrae [(1937). *Biochem. J.* **31.** 886.], growth was continued at a third of its normal rate for 4-6 weeks, after which it again ceased. When both fractions were added, full growth proceeded for five weeks, after which there was a decreased rate of gain in weight, which corresponded to a relatively decreased appetite. Those pigs which were fed on the basal diet with aneurin, riboflavin and nicotinic acid plus the eluate fraction, developed a posterior paraplegia which was not cured when the filtrate fraction was added to the food. The pigs which received the same food supplemented by the filtrate instead of the eluate developed a microcytic anaemia and became increasingly subject to epileptic fits; both of these conditions disappeared, however, when the eluate fraction was also included as a supplement.

In addition to aneurin, nicotinic acid and probably riboflavin, the filtrate and eluate fractions of Edgar and Macrae are essential for the nutrition of the pig. It is probable that yeast contains still another essential which at present is unidentified.

—G. WILLIAMSON

SCHERMER, S., & DEPPE, K. (1938). Die Wirkung der Beifütterung eines D-vitaminreichen Futtermittels. (Trockenpräparat aus Weizenkeimlingen) unter verschiedenen Fütterungsbedingungen. **[The Action of Vitamin D Supplement (Vigantol) in Various Dietary Conditions].**—*Berl. Münch. tierärztl. Wschr.* Sept. 30th. 589-591. 1 table, 1 chart. [4 refs.]

It has previously been shown [*V. B.* **9.** 501.] that feeding an unbalanced ration rich in acid foodstuffs will lower the alkali reserve of the blood and may produce symptoms of osteomalacia. The present work was done to find whether the administration of vitamin D would prevent the condition. Four experiments were carried out: 23 cows, 5 heifers and 12 pigs fed on rations including large amounts of silage, beet tops, etc., were examined, some being used as controls. The alkali reserve of the blood, the serum calcium and phosphorus, and the pH and ammonia contents of the urine were estimated before, during, and after the administration of vitamin D. The administration of vitamin D (vigantol) caused a rise in the alkali reserve of the blood, a slight rise in the pH of the urine, a decrease in the ammonia content of the urine, and a rise in the serum calcium and phosphorus. The change was most marked in those animals receiving the highest proportion of acid food. In the last experiment, cows, young heifers and pigs were examined in a similar way. The diet contained a lower proportion of acid food, and the variations in the estimations were within physiological limits. The authors conclude that feeding a vitamin D supplement will rectify the results of an unbalanced ration consisting of an excess of acid food.—A. T. PHILLIPSON.

GOOMAGHTIGH, N., & HANDOVSKY, H. (1938). **Effect of Vitamin D_2 (Calciferol) on the Dog.**—*Arch. Path.* **26.** 1144-1182. 10 figs., 3 tables. [Num. refs.]

The authors made a study of the effects produced on the arterioles and kidneys of dogs by systematic dosage with calciferol. After describing the normal histology of the dog's kidney, they deal at some length with the physiological and histological changes arising as a result of excessive administration of calciferol. The investigation showed that daily doses of about 100γ per kg. body weight over a period of 100 days are beneficial to the health of normal adult dogs, in that hypertrophy of the arteriolar walls and stimulation of the thyroid and liver cells result. Doses of over 600γ per kg. cause regressive lesions, particularly in the renal arterioles, leading in 17-45 days to cell necrosis. The resulting symptoms are those of nephritis with uraemia. The changes in the arterioles are probably reversible provided they have not progressed too far. Arterioles of puppies and young dogs are more resistant to overdosage with calciferol, but here daily doses of over 600γ per kg. cause thymus regression and retarded growth. The significance of these observations is discussed with reference to human arteriosclerosis and Bright's disease.—N. J. SCORGIE.

PUBLIC HEALTH

NARBUTAS, J. (1938). Pieno ir mesos sanitarine priežiura kitose valstybese. **[Milk and Meat Hygiene in Certain Countries].**—*Vet. ir Zootech., Kovno.* **15.** 1-18.

N. visited dairy-farms and abattoirs in Berlin, Mannheim, Nuremberg, Munich, Salzburg, Vienna and Budapest, and describes their methods of milk and meat inspection.—A. PABIJANSKAS (KAUNAS).

SCHWERDT. (1939). Ist die elektrische Betäubung der Schlachttiere schmerzlos ? Beweis der Schmerzlosigkeit durch einen freiwilligen Versuch am Menschen in einer Fleischwarenfabrik erbracht. [**Electric Stunning of Slaughter Animals. Proof of its Painlessness by a Voluntary Test on a Man**].—*Berl. Münch. tierärztl. Wschr.* Jan. 20th. 44.

A German abattoir worker tested an electrical stunning apparatus on himself, applying the electrodes behind his ears. He was stunned for one minute and on recovery said that the stunning had been painless.—J. E.

STONE, R. V. (1938). **A Cultural Method for Classifying Staphylococci as of the "Food-Poisoning" Type.**—*Proc. Soc. exp. Biol. N.Y.* **33.** 185-187. [10 refs.]

S. describes a method for the identification of food-poisoning staphylococci on beef extract plus gelatin medium. Enterotoxic strains produced liquefaction ; no liquefaction evidenced a non-enterotoxic strain.

CHAPMAN, G. H., LIEB, C. W., & CURCIO, Lillian G. (1937). **Isolation and Cultural Differentiation of Food-Poisoning Staphylococci.**—*Food Res., Ill.* **2.** 349-367. 9 tables. [11 refs.]

The authors have elaborated tests for the isolation of food-poisoning staphylococci, based on tests for pigment, haemolysin and coagulase. Loss of any of these properties indicates degeneration of the strain ; haemolysis is the best test. Since STONE's claim [see above] that food-poisoning staphylococci could be differentiated from other species by their action on a special gelatin agar medium, was not confirmed by other workers, his method was reinvestigated. His reaction was found in 70·5% of typical food-poisoning staphylococci, in 27·6% of strains with similar cultural properties but isolated from other sources, and in 57·1% of food-poisoning strains which showed partial degeneration of the haemolytic property.

Stone's reaction should only be applied to variants which react positively to all the authors' tests. Degenerated strains may be lacking in the Stone's property. Food-poisoning staphylococci contain a combination of the gastro-enterotoxic factor with other properties common to staphylococci in general.—H. E. BYWATER.

THERAPEUTICS

HARTLEY, P. (1939). **Biological Standardization of Therapeutic Substances.**—*Brit. med. J.* Feb. 4th. 240.

There are a large number of therapeutic substances of which the potency and purity cannot be adequately determined by chemical means, and biological methods have been devised for their standardization and assay. The group includes antitoxins and antisera, diagnostic agents like tuberculin, insulin, pituitary preparations, the arsphenamines, the vitamins, the drugs affecting the heart, and the sex hormones. Standard biological methods are used to compare the activity of unknown preparations with that of a permanent standard.—J. M. ROBSON.

—. (1939). **Discussion on the Use of Sulphanilamide and Allied Drugs in the Treatment of Human and Animal Diseases.** [Speakers : WHITBY, L. E. H., STABLEFORTH, A. W., RIMINGTON, C., LOEWENTHAL, H., FLEMING, A., & BEVAN, L. E. W.]—*Proc. R. Soc. Med.* **32.** 349-358. 2 tables. [14 refs.]

The various contributors to this discussion drew attention to the undoubted

value of the drugs of this group in certain bacterial diseases, and asserted that the blood concentration required is not the same in all infections. They admitted the lack of information regarding the blood concentrations required, and referred to the best methods of use, particularly with regard to the dose and intervals between doses. Large doses are considered necessary. The drugs are stated to have a toxic action on the erythropoietic and leucopoietic systems, and it may be possible to estimate the degree of this action by determining the quantity of porphyrins excreted in the urine. Dr STABLEFORTH stated that sulphanilamide acts on mastitis streptococci of group C. There is as yet no evidence concerning its action on the other groups or on *Brucella abortus* infection in farm animals.—W. J. IRONSIDE.

I. MILLER, W. T., MINGLE, C. K., MURDOCK, F. M., & HEISHMAN, J. O. (1939). **The Concentration of Sulfanilamide in the Blood and Milk of Cattle and its Effect on Brucella Abortus and Streptococcal Infections of the Bovine Udder.**—*J. Amer. vet. med. Ass.* **94.** 161-171. 6 figs., 6 tables. [5 refs.]

II. BAUER, H., & GUNDERSON, M. F. (1938). **The Estimation of Sulfanilamide in Milk.**—*Cornell Vet.* **28.** 299-304. 1 fig., 2 tables. [5 refs.]

III. HOGE, W. G., HALVERSEN, W. V., & CHERRINGTON, V. A. (1939). **The Effect of Sulfanilamide Therapy upon Bovine Mastitis as Indicated by Laboratory Tests.**—*J. infect. Dis.* **64.** 27-35. [13 refs.]

I. The drug was either administered by stomach tube in a large quantity of water or given in the food. Given by stomach tube it was found that a concentration of 15 mg. in 100 c.c. of blood or milk could be produced by giving an initial dose of 0·4 g. per kg. body weight and that this level could be maintained by giving further doses of 0·15-0·2 g. per kg. body weight every 12 hours. In dry animals higher concentrations were reached in a shorter time than in animals in milk. When the drug was given in food two animals receiving 60 g. every 12 hours refused the seventh dose, while two receiving 90 g. refused the third dose. One of the treated animals was secreting *Br.a.* in the milk, one had streptococcal mastitis and a third was affected with both of the above conditions. In this third animal treatment was followed by complete clearing of the streptococcal infection, but the *Br.a.* infection in this animal and the infections in the other two animals remained unaltered.

II. The method of estimation described is based upon that given by FULLER [(1937). *Lancet.* **232.** 194-203.] for the examination of blood or urine. The method was tested on samples of milk containing known concentrations of the drug and on these samples estimations were made (a) immediately, (b) after storage in a refrigerator for 24 hours, and (c) after mixing the samples with tricholoracetic acid and storing for 24 hours. The range of error in all three cases was up to 4%.

III. The effect of sulphanilamide on the number of mastitis streptococci and of leucocytes present in milk is recorded, and some account is also given of the effect of the drug on mastitis streptococci and staphylococci *in vitro*. In the *in vivo* experiments the drug was given in gelatin capsules in doses ranging from 5-15 g. per 100 lb. body weight per day at intervals of 12 or 8 hours and for periods of about 10 days. A dose of 15 g. was not well tolerated and had to be reduced, but a concentration of 8 mg. per 100 c.c. of blood was obtained. It was found that streptococci disappeared while animals were under treatment but reappeared when treatment was stopped. The effect upon the number of leucocytes was found to be variable. Experiments on the *in vitro* effects showed that organisms were viable after a week's exposure to a concentration of 10 mg. per 100 c.c. of

milk, and that some remained alive where the concentration was 100 mg. per 100 c.c.—W. J. Ironside.

De, S. P., & Basu, U. P. (1938). **Synergy in Experimental Chemotherapy of Staphylococcal Infections.**—*Brit. med. J.* Sept. 10th. 564-565. 1 table. [5 refs.]

The subcutaneous injection of *p*-aminobenzenesulphonamide combined with an intraperitoneal injection of antiserum protected mice against a staphylococcal infection which proved fatal to controls. The drug or the serum alone afforded a protection which was far short of that produced by their combined action.—G. W.

Holstein, G., & Richou, R. (1938). Essais de traitement des staphylococcies cutanées du chien au moyen de l'anatoxine spécifique, seule ou associée à l'administration de dérivés sulfamidés azoïques ou non azoïques. [**Treatment of Cutaneous Staphylococcal Infection in Dogs with Specific Anatoxin, alone or together with Sulphamide Azo Compounds and Sulphamide Alone**]. —*Bull. Acad. vét. Fr.* **11.** 158-166. 1 table. [11 refs.]

The authors describe treatment with anatoxin of 15 dogs with cutaneous staphylococcal infection. The results, although good, were not always successful. It was found that dogs acquire and maintain natural and induced staphylococcal immunity with difficulty. There were indications that doses of sulphamide azo compounds or sulphamide itself aided the action of the anatoxin. No contra-indications were found. Details of dosage are given.—G. Williamson.

Taskin, J. (1938). Traitement des complications nerveuses de la maladie de Carré, par l'hexaméthylène-tétramine (formine) et le dioxydiamino-arsènobenzène-méthylène-sulfonate de sodium. (sulfarsénol). [**Treatment of the Nervous Complications of Dog Distemper with Hexamethylenetetramine and Sodium Dioxydiaminoarsenobenzene Methylene Sulphonate (Sulpharsenol)**].—*Bull. Acad. vét. Fr.* **11.** 490-494. 1 table.

The drugs were given simultaneously in 24 cases and alternately in 17. The results were good with both, and the one was as good as the other. The doses were :– every day or every second day, 1-2 mg. per kg. for sulpharsenol, and 33-66 mg. per kg. for hexamethylenetetramine.—G. Williamson.

Levaditi, C., Vaisman, A., & Reinie, L. (1938). La chimiothérapie antiendotoxique. [**Anti-Endotoxic Chemotherapy**].—*Ann. Inst. Pasteur.* **61.** 635-661. 2 tables. [Numerous refs.]

In 1937 [*V. B.* **9.** 423.] the authors obtained evidence suggesting that the curative action of sulphonamide compounds involved a neutralization of bacterial endotoxins. Further evidence supporting this has now been obtained, and it has been shown that the conclusion is of general validity and applies to the endotoxins produced by gonococci, meningococci, *Salmonella typhi-murium*, *Bact. flexneri*, *Bact. shigae*, and *Pasteurella aviseptica*. 4-nitro-4′-aminodiphenylsulphoxide is the most active anti-endotoxin drug tested. The anti-endotoxic and anti-bacterial activity of a drug are not always similar. The drugs do not affect the action of exotoxins (diphtheria, *Vibrion septique*, staphylococcus, snake venom, dysentery) and do not affect the action of the endotoxins when added to them *in vitro*. It is suggested that the drugs undergo some change in the body before they can exert their action.—J. M. Robson.

LLOVEROL, H. (1939). Le sérum normal de cynocéphale (*Papio papio*, Desm.) dans le traitement de la trypanosomiase expérimentale du mouton à *T. dimorphon*, Laveran et Mesnil. [**The Normal Serum of the Baboon** (*Papio papio*) **in the Treatment of Experimental Trypanosomiasis of Sheep Caused by** *Tryp. congolense*].—*Bull. soc. Path. exot.* **32.** 328-334. [6 refs.]

Baboon serum was given intravenously in doses of 15-20 c.c. to five sheep infected with *Tryp. congolense*, three other sheep being kept as controls. Two of the treated sheep recovered after two or more serum injections, whilst all the control animals died from a progressive trypanosome cachexia. Of the other three treated sheep, two died after the disappearance of trypanosomes from the blood, and in one animal the baboon serum failed to cause a disappearance of trypanosomes.—U. F. RICHARDSON.

STEFFENS, M. (1937). Schafräudebehandlung mit " Räude-Derrisol "-Bengen. [**Treatment of Sheep Scab with Derrisol**].—*Dtsch. tierärztl. Wschr.* **45.** 653-654. 2 figs. [10 refs.]

Derrisol was found to be effective in an experiment on 15 Irak sheep, heavily infested with *Dermatocoptes*, *Melophagus ovinus*, and *Trichodectes sphaerocephalus*. The animals were dipped twice, at ten days' intervals, in a 5% " derrisol " solution with 2% of soft soap, at about 35°C. The solution should be prepared with water free from lime, and should be continually stirred during the treatment. Care should be taken lest the animals swallow any of the solution.

BERNARD. (1938). Behandlung von Wurmerkrankungen mit Arsinosolvin Bengen und Tartarus stibiatus. [**Treatment of Sclerostome and Ascarid Infestation with "Arsenosolvin " and Tartar Emetic**].—*Dtsch. tierärztl. Wschr.* **46.** 386-390. [17 refs.]

Treatment for horses consisted of intravenous injections of " arsenosolvin " followed by 10 g. of tartar emetic in watery solution *per os* on the following day, the whole being repeated three or four times at intervals of 5-14 days. It is stated that ascarids were expelled completely, but that in three horses out of ten the sclerostome eggs were still being excreted in significant numbers. In six horses which received " arsenosolvin " only there was no marked decrease of either ascarid or sclerostome eggs, but the condition of four of the horses improved. It is stated that " arsenosolvin " seems to act as a tonic and not as a vermifuge. Fourteen severely affected horses, some of which had oedema on the legs, improved after combined therapy, and ten of them increased in weight. The treatment described by RITCHERS and FRISCHBIER [(1930). *Berl. tierärztl. Wschr.* 493.] (tartar emetic intravenously and *per os*) is more effective in the control of sclerostomes.

—V. CHLÁDEK (PRAGUE).

BOLEY, L. E., LEVINE, N. D., & KAMMLADE, W. G. (1938). **A Note on the Effect of Repeated Treatment of Sheep for** *Haemonchus contortus*.—*Cornell Vet.* **28.** 296-298. [8 refs.]

Eight ewes were given copper sulphate on each of four successive days and then at weekly intervals for seven weeks, and eggs of *H.c.* could be demonstrated in the faeces at the end of this period. One sheep died and the other animals were then divided and given different treatments, two being given copper sulphate, two carbon disulphide, two tetrachlorethylene and one nicotine sulphate. The treatments were given at weekly intervals for seven weeks. Autopsies made four weeks after the cessation of treatment revealed *H.c.* in all except those treated with tetrachlorethylene.—W. J. IRONSIDE.

KULIKOV, N. S., & TAMARIN, J. B. (1937). Opyty legenija diktiokauleza lošadeĭ. **[Treatment of Dictyocaulosis of Horses]**.—*Papers on Helminthology Commemorating 30 Year Jubilee of Prof. K. J. Skrjabin.* pp. 302-304. Moscow: Lenin Acad. Agric. Sci.

The authors claim to have expelled *Dictyocaulus* from the lungs of seven horses by single intratracheal injections of aqueous iodine solution (iodine 0·1% + potassium iodide 0·2%), the dose being 250-300 c.c. The horses were rolled over on their sides and back during the injection. Three of the seven horses were killed and found free of the lungworms 7-10 days after treatment, and three untreated controls were found to harbour the parasites.

CARLSON, E. R. (1939). **Sheep Vermicide—A Stabilized Concentrate [Copper Sulphate and Nicotine Sulphate Solution]**.—*Vet. Med.* **34.** 48-49. 1 fig.

The concentrate is a 12% solution of copper sulphate and of nicotine sulphate and is rendered stable by the inclusion of 1·8% gum acacia.—W. J. IRONSIDE.

FOLLEY, S. J., & YOUNG, F. G. (1939). **The Effect of Continued Treatment with Anterior Pituitary Extracts on Milk Volume and Milk-Fat Production in the Lactating Cow**.—*Biochem. J.* **33.** 192-197. 5 figs. [7 refs.] [See also *V. B.* **9.** 345].

An increase in the milk yield and a very marked increase in the percentage of milk-fat followed the repeated injection of a prolactin preparation into cows in declining lactation. Similar treatment with a thyrotropic preparation produced no increase in the percentage of fat, but it did increase the milk output, though to a lesser degree. The yield of the cows receiving prolactin, after steadying at a high level, eventually declined in spite of continued treatment.—G. WILLIAMSON.

POISONS AND POISONING

COUTURE, A. (1938). L'intoxication saturnine chez les animaux. **[Lead Poisoning in Animals]**.—*Thesis, Alfort.* pp. 115. 1 table. [Numerous refs.]

A systematic treatise on plumbism as it affects each species of animal, describing the forms in which lead is encountered, mode of entry into the body, localization in the tissue and elimination, relative toxicity, clinical manifestation, morbid anatomy, diagnosis, prognosis, prophylaxis and treatment.

Figures of toxic doses cannot be given owing to wide variations in susceptibility, but lead salts in order of diminishing toxicity are :– lead tetra-ethyl, lead acetate, lead arsenate, litharge, metallic lead, lead sulphide and lead sulphate.

The appearance of punctate basophilia in the blood of animals with chronic plumbism is regarded as pathognomonic.—D. BAMFORD.

WEDEMANN, W. (1939). Fütterungsversuche mit Kokaoschalenmehl bei verschiedenen Haustieren. **[Feeding Trials on Various Domestic Animals with Cacao Nut Husk Meal]**.—*Z. InfektKr. Haustiere.* **54.** 77-86. 2 tables. [16 refs.]

This experiment was conducted to see whether or not the theobromine content of cacao nut husk meal is harmless to stock. Young pigs, adult goats and hens were used. They were fed daily rations respectively of 10-20, 12-26, and 5-10 g. per kg. body weight cacao nut husk meal, containing 1·1-1·3% theobromine. The animals failed to increase in weight normally during the feeding trial, which lasted 50 days, although otherwise they appeared normal. W. concludes that

the meal, while not containing sufficient theobromine to cause pathological symptoms, cannot be considered an innocuous foodstuff.—A. T. PHILLIPSON.

HASSKÓ, A., & FÜLÖP, L. (1938). Beiträge zum Wirkungsmechanismus des Senfgases. [**Action of Mustard Gas**].—*Arch. wiss. prakt. Tierheilk.* **73.** 409-413. 5 figs. [3 refs.]

Mustard gas causes skin oedema within a short time in animals. The authors suggest that as histamine injected into the skin of human beings causes an exanthema resembling urticaria, a decomposition product similar to histamine might be the oedema-producing factor in mustard gas.

A few drops of liquid mustard gas were rubbed on to the inner surface of the ears of rabbits, and on to the backs of g. pigs. Blisters which formed on the rabbits' ears were drained, and the oedematous tissue was cut up and suspended in physiological saline, and the effect of the liquid and of histamine was tested on isolated small intestine from the same rabbit. The material from the mustard gas lesions caused an increase in the tone of the isolated intestine, and the nature of the reaction suggested that the substances concerned resembled histamine. Histamine caused a reaction at a dilution of 1 : 5,000. It was produced in the skin by action of the mustard gas and the amount varied according to the time which expired after the application of the gas, the greatest quantity being noted at 1½ hours. Mustard gas alone caused no contraction of the intestine.—SASSENHOFF (MUNICH).

I. KING, R. O. C. (1937). **A Device Adopted for the Forced Feeding of Suspected Poison Plants at the Veterinary Research Station, Glenfield.**—*Vet. Res. Rep., Dep. Agric. N.S.W. 1937.* pp. 120-122. 1 fig.

II. KING, R. O. C. (1937). **Verbesina encelioides (Crown Beard). A Plant Toxic to Sheep.**—*Ibid.* pp. 89-94.

III. KING, R. O. C. (1937). **Chenopodium atriplicinum (Lamb's Tongue). A Plant Toxic for Sheep in the Immature Stages of Growth.**—*Ibid.* pp. 95-100. 1 table.

IV. SEDDON, H. R., & KING, R. O. C. (1937). **Noogoora Burr (Xanthium chinense). Poisonous for Stock in Very Early Stage of Growth.**—*Ibid.* pp. 101-108. [6 refs.]

V. HINDMARSH, W. L., & HART, L. (1937). **Castanospermum australe. (Black Bean, Moreton Bay Chestnut.) Green Seeds Poisonous to Stock.**—*Ibid.* pp. 109-114. 2 tables. [5 refs.]

VI. HINDMARSH, W. L. (1937). **Cestrum nocturnum. A Plant Poisonous to Stock.**—*Ibid.* pp. 115-117. 1 table. [4 refs.]

VII. HINDMARSH, W. L. (1937). **Salvia coccinea. A Garden Escape Poisonous to Stock.**—*Ibid.* pp. 118-119.

I. The device, which is fully described, is essentially a modified "balling" gun. It was designed to overcome the common difficulty of inducing animals to ingest sufficient quantities in feeding tests of plants suspected of toxic or harmful properties. It has apparently been used mainly with sheep. Using the gun, doses of two to four pounds can be given to a sheep and a dose of six pounds has been administered.

II. This plant was suspected to be toxic to sheep if eaten in sufficient quantity. The most constant lesions found on autopsy in suspected natural and in experimental cases consisted usually of excessive pleural exudate and patchy congestion of the lungs. More or less intense gastro-enteritis with accompanying toxic changes in the liver (acute central necrosis) and kidneys (acute parenchymatous nephritis) was noted but these were inconstant features.

III. The fresh immature stages of this plant were toxic for guinea pigs and sheep but not for cattle or pigs. The air-dried immature plant and the mature seeding stage were found to be less toxic than the fresh immature stage, or atoxic. The lesions induced experimentally correspond with those of suspected cases in the field and consist of gastro-enteritis involving the abomasum and small intestine, but not the large intestine, intense congestion of the brain, spinal cord and meninges, and congestion and necrotic changes in the liver and kidneys.

IV. The plant was toxic for pigs, sheep and cattle in the very young stages while cotyledons were still present. The lethal dose was 2% of the body weight for pigs, 1·8% for calves and a much higher percentage for sheep. A lethal dose caused death in twenty to forty-eight hours. The main lesions were those of a haemorrhagic gastro-enteritis, congestion and necrosis of internal organs, ascites and hydrothorax.

V. Large quantities of the ripe fruit (husk and seeds respectively) were fed to cattle and horses without ill-effect. Smaller amounts of the unripe seeds caused intense gastro-enteritis in cattle but appeared to be less toxic for horses. There was some evidence that the husks alone may cause gastro-enteritis.

VI. This plant, which was introduced to Australia as an ornamental shrub, has occasionally escaped from cultivation, but is only eaten by stock in exceptionally dry seasons. Symptoms observed during feeding experiments with cattle were depression and marked salivation. The main lesions were gastro-enteritis, and hepatic, renal and cerebro-spinal congestion.

VII. The result of a feeding test with a yearling steer supports the opinion held locally that the plant in the young stage is toxic for cattle. Symptoms were mainly those of extreme weakness and incoordination of movement. The main lesions observed were gastro-enteritis, slight congestion of liver and kidneys, and intense congestion of the meninges with submeningeal haemorrhage over the pons, and haemorrhage into the ventricles.—H. B. Carter.

Savickis, J. (1938). Chroninis arkliu apsinuodijimas paprastaisiais vikiais. [**Chronic Poisoning of Horses by Common Vetch**].—*Vet. ir Zootech., Kovno.* **15.** 97-108. [German summary].

In 1937, poisoning of horses by vetch in fodder was observed in several districts in Lithuania. Acute and subacute forms of the condition appeared, working horses 8-12 years old being chiefly affected. The condition was characterized by restlessness, weakness of the hindquarters, yawning, loss of appetite, inability to drink, constipation, and difficulty in urination. The temperature was about 38·5°C., and rose further shortly before death ; the pulse was accelerated, and breathing was difficult. The visible mucosae were icteric. Autopsy revealed brain hyperaemia, degeneration of the cardiac muscle, diffuse subendocardial haemorrhages, hepatic necrosis, and nephritis.

Inoculation experiments on rabbits excluded the possibility of epizootic encephalomyelitis.—A. Pabijanskas (Kaunas).

Angeloff, S., & Thomoff, Z. (1939). Erkrankungen der Rinder und Büffel nach Aufnahme von Eichenknospen und jungen Eichenblättern. [**Poisoning of Cattle and Buffaloes with Oak Buds and Leaves**].—*Dtsch. tierärztl. Wschr.* **47.** 55-58. [6 refs.]

In the spring a wide-spread disease of cattle and buffaloes resembling haemorrhagic septicaemia was observed in many hilly parts of Bulgaria. It was found not to be infectious. The temperature of the affected animals was subnormal, there

was oedema of the lower parts of the body, haemorrhagic gastro-enteritis with infiltrations of the subserosa, and oedema of the lungs often followed by catarrhal pneumonia, the lymph nodes being moist but not inflamed. The first and constant symptom of the disease was albuminuria. The milk was bitter. The disease was due to poisoning by buds and young leaves of the oak tree. It is advisable not to graze cattle on pastures containing oak trees during the spring. Curative treatment was unsuccessful.—V. CHALDEK (PRAGUE).

PHYSIOLOGY

POTHMANN, Emily. (1937). Der Eisengehalt der Milch verschiedener Haustiere. **[Iron-Content of Milk of Various Domestic Animals].**—*Inaug. Diss., Hanover.* pp. 20. 6 tables. [Numerous refs.]

Using a modified Lintzels method, 145 assays of the iron content of milk were made with the following results :– cows' milk, 0·507 mg. Fe per litre (32 assays, 9 cows) ; goats' milk, 0·454 mg. Fe per litre (15 assays, 5 goats) ; sheeps' milk, 1·100 mg. Fe per litre (36 assays, 10 sheep) ; mares' milk, 0·683 mg. Fe per litre (24 assays, 7 mares) ; sows' milk, 1·105 mg. Fe per litre (24 assays, 9 sows), and bitches' milk, 4·108 mg. Fe per litre (4 assays, 1 bitch). The analysis was made at three stages in a lactation period and, except in the goats, the colostrum was also examined. The colostral milk contained most Fe. The Fe content decreased from the first week of the lactation period and advanced again towards the end. —G. WILLIAMSON.

MANN, T., & KEILIN, D. (1938). **Haemocuprein and Hepatocuprein, Copper-Protein Compounds of Blood and Liver in Mammals.**—*Proc. roy. Soc.* Ser. B. **126.** 303-315. 4 figs. on 1 plate. [Numerous refs.]

Details are given of a method of isolation of a blue copper-protein compound, haemocuprein, from the R.B.C. and serum of mammals. This compound has been obtained in a pure crystalline state from ox R.B.C., and in a highly purified and partly crystalline state from sheep and horse R.B.C. and from horse serum ; the pure compound contains 14·35%N, 1·12%S and 0·34%Cu. Similarly, an almost colourless copper-protein compound, haematocuprein, also containing 0·34%Cu, has been isolated from ox liver. The two compounds have various properties in common, especially in not combining with oxygen [in contrast with the pigment haemocyanin of Mollusca and certain Crustacea analagous to haemoglobin but containing Cu in place of Fe in the molecule] and in not exhibiting any of the catalytic properties of enzymes. Their possible biological significance is discussed in relation to the known effects of Cu on blood formation, growth, and metabolism of organisms.—ALFRED EDEN.

HEWITT, L. F. (1938). **Serum Proteins in Normal and Pathological Conditions. I. The Blood Serum of Normal Animals. II. Human Blood Serum and Pathological Body Fluids. III. Horse Serum Studied by Means of the Precipitin Reaction.**—*Biochem. J.* **32.** 1540-1553. 1 fig., 12 tables. [Numerous refs.]

Attempts to separate serum into chemically distinct homogeneous individual proteins resulted in the detection of pseudoglobulin-A, globoglycoid, crystalbymin and seroglycoid in human, horse, ox and rabbit sera. Conditions were studied under which mixing of pseudoglobulin-A and globoglycoid produces a precipitate

of euglobulin II. In a nephritic patient the protein fractions were found similar whether derived from serum, urine, ascitic fluid or pleural effusion, and could not be distinguished from normal serum proteins. Specific precipitating sera were prepared for the four horse serum proteins, pseudoglobulin-A, globoglycoid, crystalbumin and seroglycoid. It is shown that the route and method of injection of crystalbumin have marked effects on the antigenicity. Approximate figures for the composition of normal horse serum in terms of four of the individual protein constituents were obtained by means of quantitative precipitin tests. The results were: pseudoglobulin-A, 2·6%; globoglycoid, 0·5%; crystalbumin, 1·9%; seroglycoid, 0·5%, and other proteins, 1·9%. In the serum of a horse immunized against diphtheria toxin the pseudoglobulin-A content increased three-fold and the crystalbumin content fell to half its normal value. After intraperitoneal injection of a rabbit with horse serum, the various horse serum protein fractions were detected by precipitin tests in the rabbit's blood stream within 15 minutes of the injection. The maximum concentration of foreign protein was reached after 1-4 hours, and fell very slowly, traces being still detectable after a fortnight's interval. Traces of horse serum pseudoglobulin-A and crystalbumin were detected in the cerebrospinal fluid of patients injected intravenously with horse serum.
—R. Allcroft.

Ellis, M. (1938). **The Function of the Bronchial Tubes.**—*Lancet.* **234.** 819-825. 13 figs. [Numerous refs.]

By means of a special bronchoscope it has been shown that rhythmic changes of calibre synchronous with respiratory movements, occur in the bronchi of the dog. These movements are produced passively in response to the respiratory thoracic movements. The bronchial tubes were shown to be in a state of constant tone which could be modified reflexly from many sites. An indication of the possible relationship of attraction of the tone of the bronchi to spasmodic respiratory diseases is suggested.—R. N. C. Aitken.

Silberberg, M., & Silberberg, Ruth. (1938). **Effects of Anterior Pituitary Implants and Extracts on Epiphyses and Joints of Immature Female Guinea Pigs.**—*Arch. Path.* **26.** 1208-1225. 5 figs., 5 tables. [12 refs.]

Histological examination of the knee joints and tibias of 136 immature female g. pigs treated either with anterior pituitary extracts or implants from cattle, showed that this portion of the organ contained one or more substances which exerted two main effects on the epiphysial cartilage, (1) a swelling of the chondromucoid matrix, followed by or associated with atrophy and degeneration of whole rows of cells in the epiphysial cartilage; in most cases these degenerations were associated with or followed by very extensive calcification: (2) hyperplasia and hypertrophy of the cells in the different layers of the epiphysial cartilage, the chondrophyte and the cartilaginous covering of the joint.

It is concluded that the growth of cartilage is probably a direct response to the stimulation exerted by a substance present in the anterior lobe of the pituitary gland, rather than a regenerative process caused by degenerative changes.

There was no evidence which indicated that the anterior lobes of pituitary glands of different kinds of cattle such as the steer, heifer, cow and bull, differed in its action on the cartilage.—R. Allcroft.

Pierre, M. (1938). Endocrinologie parathyroïdienne. [**Parathyroid Endocrinology**].—*Rev. Méd. vét., Toulouse.* **90.** 657-679.

A review article in which P. deals with the parathyroids under the headings

anatomy, physiology, and physio-pathology. From all the experimental evidence he has studied, P. concludes that the initial factor involved in the tetany of parathyroidectomized animals is the retention of mineral phosphorus in the blood. This results from lowered urinary excretion of phosphorus, in explanation of which two theories are discussed, *viz* :– (1) lowered excretion of parathyroid hormone, with a resultant rise in the threshold of renal excretion, and (2) the catalytic function of the hormone, which leads to the formation of a complex soluble phosphorus-calcium salt which is rapidly eliminated in the urine. Hypocalcaemic symptoms (tetany, etc.) are only observed if the available calcium is insufficient for complete phosphorus elimination.

Dealing with the regulating mechanism of the parathyroids, P. regards the parathyroid-stimulating hormone secreted by the anterior pituitary as the principal factor. He develops the thesis that the various tetanies observed in animals (tetany of the young, and grass and lactation tetanies) are due to hypoparathyroidism arising as a result of insufficient secretion of the parathyroid-stimulating hormone. Hyperparathyroidism in human and veterinary medicine is briefly dealt with, reference being made to osteitis fibrosa in animals.—N. J. SCORGIE.

JOYNER, A. L. (1938). **A Study of the White Blood Cells of the Normal Guinea Pig.**—*Amer. J. Anat.* **62.** 497-506. 6 figs., 3 tables. [10 refs.]

J. carried out 338 counts on 232 g. pigs, using both the fixed smear method and the supravital technique. The neutrophile was the most numerous cell, and the count differed little from that of human blood. The lymphocyte was the next most numerous ; supravital staining showed clearly that it was only this cell which contained Kurloff bodies, the benign cytoplasmic inclusion bodies always present in g. pig blood. In supravital preparations of g. pig blood, the granules of the basophile are larger than those in the eosinophile, whereas in other species the eosinophile contains larger granules than any other cell ; the g. pig basophile is, however, clearly classified as such because of its metachromatic granule. Although the g. pig basophile is generally reported to be oxidase-negative, J. found that occasionally a basophile contained particles, in between the oxidase-negative granules, which exhibited a strong positive reaction to the peroxidase stain ; this suggests that this cell possesses a hitherto unrecognized property. The article includes detailed tables ; these show that a large range must be considered for all types of cell.

TECHNIQUE AND APPARATUS

WILKS, R. A. C. (1938). **A New Decalcification Fluid. [Correspondence].**—*Nature, Lond.* **142.** 958-969.

The method consists of treating the tissues, after fixation, with aqueous solutions of sodium hexametaphosphate in strengths up to 30% of a neutral salt. The reaction involved is a simple replacement of Ca by Na, and complete decalcification of the highly calcified integuments of some of the Crustacea was effected in a day without any distortion. When applied to echinoderm and mollusc material, the process was equally successful but slightly slower. Mammalian bone was also softened but the penetration was much slower.—R. ALLCROFT.

HARDY, A. C. (1938). **Estimating Numbers Without Counting. [Correspondence].**—*Nature, Lond.* **142.** 255-256. 2 figs.

The method was devised to furnish rapid estimates, without counting, of the

numbers of some of the more important species of the marine plankton, but it is thought that it could be applied to the estimation of the seed production of plants or samples of small insects all of one species where an estimation within $\pm 15\%$ of the actual numbers would be sufficient. A scale of dots is made and the dots so arranged that when a mask with a circular opening is placed over the scale, the number visible will increase by a definite amount as the mask is slid from left to right. From such a scale others can be made having, instead of dots, life-size photographic images of the objects to be estimated. Alongside is placed the sample, spread as evenly as possible, in a circular dish of the same size as the opening in the mask ; the scale is turned to right or left until its number of images appears equal to that of the objects in the sample, and the number is read off from the scale.—R. ALLCROFT.

MUMFORD, P. B. (1939). **A Suggested Skin Protective.**—*Brit. med. J.* Feb. 11th. 266-267. [1 ref.]

A new protective agent for the skin named " HEB " is described. It consists of higher fatty alcohols (palmityl and stearyl), acid esters of these higher fatty alcohols, liquid paraffin, hard paraffin wax, water and perfume. The constitution of a similar " waterproof " preparation is the same but lanolin replaces the hard paraffin. Some of the disadvantages of the skin protectives now in use are discussed and the characteristics of the ideal protective agent are enumerated.—R. ALLCROFT.

KANTHER, H. (1937). Untersuchungen über Beziehungen zwischen Senkungsgeschwindigkeit der Erythrozyten und dem Verhalten des Albumin-Globulin-Gehaltes des Serums sowie der Sublimateprobe bei gesunden und kranken Pferden. [**Relation of the R.B.C. Sedimentation Rate to the Albumin : Globulin Ratio of Blood Serum and the Sublimate Test in Healthy and Diseased Horses**].—*Inaug. Diss., Hanover.* pp. 33. 4 tables. [Numerous refs.]

Sixty-one horses with various ailments were examined. In addition to the tests specified in the title, erythrocyte and leucocyte counts were made and the haemoglobin content of the blood was estimated. It was found that an increased R.B.C. sedimentation rate and a positive sublimate test occurred in 79% of cases. An increased rate of R.B.C. sedimentation and an albumin:globulin ratio of under 0·66 occurred in 60% of cases. Agreement between the sublimate test, the R.B.C. sedimentation rate and the albumin:globulin ratio was found in 34% of cases. It is difficult to evaluate the results given.—A. T. PHILLIPSON.

MISCELLANEOUS

I. —. (1938). **Report of the Committee on Legislation.** [**U.S. Live Stock Sanit. Ass.**]—*J. Amer. vet. med. Ass.* **92.** 441-444.

II. —. (1938). **Report of the Committee on Resolutions.** [**U.S. Live Stock Sanit. Ass.**]—*Ibid.* 470-472.

III. —. (1938). **Report of the Committee on Policy.** [**U.S. Live Stock Sanit. Ass.**]—*Ibid.* 472-474.

I. Details are given of replies received from 37 States to a request for information regarding legislation affecting the live stock industry passed since December 1936. The recommendations of the committee were that the Association should

(a) file copies of all legislation relative to live stock passed in the U.S.A. and Canada, and (b) press for legislation to control the manufacture and sale of biological products containing live organisms or active virus.

II. Resolutions were submitted on :– (a) an investigation on trichinosis in swine in co-operation with live stock, sanitary and public health officials, (b) the maintenance of restriction against the introduction of contagious diseases of animals, (c) the provision of funds for a campaign against contagious abortion in cattle, and (d) the appointment of veterinarians to eradicate *Salmonella pullorum* infection under the National Poultry Improvement Plan.

III. This committee recommended that more attention should be paid to the questions of the control of dangerous livestock conditions and the prevention of disease in livestock ; they also suggest that a monthly report on disease conditions in the U.S.A. and neighbouring countries should be published. Another recommendation is that the U.S. Bureau of Animal Industry should form a division of vital statistics of live stock.—J. C. Wallace.

Tsai, V. (1936). **Animal Husbandry in China.**—*Insp. & Comm. J., Shanghai.* **7.** No. 10. 1-13. 2 figs., 6 tables.

An account is given of the need of animal labour in China at this period, the territorial distribution of domestic animals, the different methods of animal husbandry, and statistics of exports of animal products. Veterinary education and research, the distribution of disease, and the importance of animal disease prevention in China are also discussed. The number of trained veterinarians was small, only three schools being in existence. These were the Military Veterinary School at Peiping, the Department of Animal Husbandry and Veterinary Medicine of the National Central University, and the Veterinary School at Shanghai. There was need for 10,000 Chinese veterinarians. Production of sera and vaccines was progressing rapidly, five laboratories being engaged in this work ; two were under the control of the Ministry of Industry, one under the Health Administration, one under the Kwantung Provincial Government and one under the Kwangsi Government. Veterinary research was in a rudimentary stage because of the lack of veterinary education. Only one establishment, the Epizootic Prevention Service at Shanghai, was conducting research.—Hugh N. Spears.

OFFICIAL AND OTHER REPORTS

Canada, British Columbia. (1937). **Report on Animal Diseases in 1936.** [Knight, A.]—*Rep. Dep. Agric. Can., 1936.* pp. 56-59 and 61-63.

Under the heading nutrition and animal health in the report of the Live Stock Commissioner, the education of livestock owners in malnutrition due to vitamin and mineral deficiencies is dealt with. Progress is reported in warble-fly and tick control in the districts where work was undertaken.

Tuberculin testing formed the major portion of the work in the Veterinary Branch. The following diseases occurring in small sporadic outbreaks were also reported :– blackleg, haemorrhagic septicaemia, coccidiosis, keratitis, and foot-rot of sheep. Investigation of bovine haematuria, endemic in certain areas, has been undertaken by the Dominion Government.—L. M. Heath.

AUSTRALIA, NEW SOUTH WALES. (1938). **Department of Agriculture. Veterinary Research Report No. 7, 1937.** [HINDMARSH, W. L.] pp. 125. 3 plates, numerous tables. [Numerous refs.] Sydney: Govt. Printer. [8vo].

In an introduction the Director of Veterinary Research discusses staff changes, diagnostic work (summarized in tables) and research work. Under the latter heading investigations into the following are noted:– swelled head in sheep, "yellows" or jaundice of sheep, nutritional anaemia of sheep, sheep blowfly, carbon tetrachloride poisoning in sheep, wool discolourations and fleece rot, plethoric toxaemia of lambs, contagious bovine pleuro-pneumonia, contagious bovine abortion, streptococcal mastitis, sterility in dairy cows, plant poisoning (*Eucalyptus corynocalyx* and *Heliotropium europaeum*), pullorum disease of poultry, poisoning by ergotized paspalum, and deformity in calves.—H. McL. GORDON.

ITALY. (1938). Relazione sulle attività della Stazione nel quinquennio 28 ottobre 1932-XI - 28 ottobre 1937-XVI. [**Report of the Veterinary Research Institute of Sicily, 1932-1937**]. [MIRRI, A.]—*Azione vet.* **7.** 293-322. 5 figs., 8 tables.

Much work was done on ANTHRAX, of which 43 outbreaks occurred during the five-year period 1933-1937. Obligatory vaccination at least once a year is carried out with the aid of a vaccine produced by the Institute since 1931, with which over 6,000,000 head of cattle in Sicily and elsewhere have been treated. Statistics show a decrease in the annual average of cases from 123 *per annum* from 1927 to 1931, to 47 cases *per annum* from 1932 to 1936.

BRUCELLOSIS is very common in goats and is sometimes also found in cattle and sheep. The goat infection is due solely to *Br. melitensis.* The results of a three-year investigation in two provinces into the infection in goats with the aid of Mirri's brucellin are given in a table. Positive reactors varied between 3·6% and 7·5%.

PULLORUM DISEASE is not widespread in Sicily although a few cases (13 in all) have been found in two localities. 93 cases of EPIZOOTIC LYMPHANGITIS were diagnosed. It is claimed that a preparation composed of 1 g. corrosive sublimate, 1 g. sodium chloride and 0·25 g. "subcutina" [details not given] in 100 c.c. of water cures 90% of cases after 4-7 injections.

124 cases of CONTAGIOUS AGALACTIA were diagnosed, 10% being joint and eye cases and 95-100% mammary cases. A fourth type called the "marasmatic" form is mentioned as occurring in young lambs and kids. It is thought that some cases of abortion may be due to this virus. It is suggested that the virus which can be cultivated may be merely a secondary invader, but that it has a special affinity for the real virus, the latter not being cultivable, and that in cultures the real virus gradually dies out. This would explain the loss in virulence of cultures. Work is being carried out in the hope of finding a curative agent. Stovarsol is ineffective.

A serum and a vaccine for the treatment of GAS GANGRENE have been produced, as well as vaccines for FOWL POX, FOWL CHOLERA and FOWL TYPHOID. Good results are claimed for the curative treatment of an outbreak of EQUINE INFLUENZA in 90 horses by arsenobenzol preparations; one animal died and the rest recovered.

Details are given of articles for farmers published in various journals, and also of scientific articles by the members of the institute staff that have been published.

CARDONA, L. (1938). Sul pubblico mattatoio di Asmara. **[Report of the Public Abattoir at Asmara, Eritrea, for 1937]**.—*Azione vet.* **7.** 90-94. 3 figs.

This is a survey of the work done at the abattoir at Asmara during the second half of 1937. The building is divided into two separate parts, one for Moslems and the other for Christians. The numbers of animals slaughtered were :– 10,321 cattle, 2,748 calves, 9,630 goats and sheep, 9,851 lambs and kids, and 81 swine. 15 cattle, 3 calves and 2 sheep were rejected as unfit. The incidence of the diseases most often found were :– hepatic distomatosis 8%, echinococcosis 6% in liver and 2% in lungs, exudative pleuropneumonia 4% and cysticercosis 4%. Cases of tuberculosis, bovine " farcy " (streptothricosis), heartworm infestation and echinococcosis are described. 174 sheep and goats were tested with Mirri's brucellin and positive reactions were obtained in 2·24%. The better utilization of the by-products of slaughtering is discussed.

BOOK REVIEWS

RUNNELLS, R. A. [D.V.M., M.S., Associate Professor of Veterinary Pathology, Iowa State College]. (1938). **Animal Pathology.** pp. xvi+464. 127 figs. [Numerous refs.] Ames, Iowa : Collegiate Press, Inc. [8vo] [$6.00].

R. in his preface states that this book has been written principally as a text-book for the courses in general and special pathology which are given in most American veterinary colleges, and later states that it is written entirely from an American point of view, and does not deal with animal diseases which are not generally encountered in America. That such has been the case soon becomes apparent to anyone reading the book. Comparatively few references are given to other than American publications, almost all the illustrations are taken from the journals of the American Veterinary Medical Association and the nomenclature is that employed in the fourth edition of BERGEY'S *Manual of Determinative Bacteriology*.

Although a reviewer who is engaged in teaching these subjects in Great Britain is sorely tempted to refer to subjects which are either omitted or but cursorily treated, one feels that it would be unfair to do so at any length in view of the author's comments in the preface.

The book is divided into three parts. Part I deals with general pathology, and 184 pages are devoted to it ; this is undoubtedly the best part of the book. Part II, consisting of 165 pages, deals with systemic pathology, and Part III, of 94 pages, concerns the special pathology of the infectious diseases. It should be mentioned that Parts II and III were included in the author's *Guide to the Study of Special Veterinary Pathology* [(1935). *V. B.* **5.** 775.], but they have been extensively revised and rewritten for this book.

It is Part III which has given the reviewer the greatest disappointment. Whilst there is justification in a pathology text-book for excluding from consideration the characteristic features of the causal bacteria, in a section devoted to the pathology of the infectious diseases some detailed information is expected regarding the gross and microscopic changes to be found in these conditions. It is felt that even for students the matter has been over-condensed, and that much important information is lacking. For example the lesions in tuberculosis are dismissed in twelve lines, and tuberculous mastitis receives no particular mention. A few more photomicrographs would also be helpful to the reader.

This review cannot be ended, however, without a tribute to the excellence of many of the illustrations. Indeed the book as a whole has been well produced and is very attractive to read.—GWILYM O. DAVIES.

CHRISTOPHE, L. (1939). [Chargé de Cours à l'Université de Liége]. La mort des brûlés. Etude expérimentale. [**Death from Burns: Experimental Study**]. pp. 93. 9 plates, numerous tables and charts. [Numerous refs.] Paris: Masson et Cie. [8vo] [Fr. 40].

C. refers to the literature on burns, and quotes 205 cases with 40 deaths; 27 of these were due to primary shock in the first 24 hours, and 13 to secondary shock in one to three weeks without infection of the lesions. It is difficult to study the phenomena associated with early death owing to the rapidity with which they occur but C. believes that some light may be shed on this problem by a consideration of the causes of delayed death.

Part I reviews the theories that have been advanced to explain early death in burns. One of these is loss of function of the skin. Another concerns changes in the circulatory system. This might include thrombosis affecting the vessels of the cerebral cortex and large arteries; rapid concentration of the blood due to serum loss; heating of the blood, and disintegration of the red cells with blocking of the convuluted tubules of the kidneys. Nervous shock may also cause early death. When the burn is severe there is a rise in blood pressure followed by a fall amounting to collapse. The initial rise does not occur when the dorsal or cervical cord is severed, or when an animal is burned under deep narcosis. The phenomena have been attributed to changes in the medulla caused by the severe thermal injury. Another cause of early death is thought to be circulatory shock. This theory was based on the production of disintegrated albumin break-down products, or of a substance of the histamine type, since a parallel exists between traumatic and histamine shock; low blood pressure, capillary dilatation, and corpuscular concentration of the blood due to loss of serum are common to both.

Finally it was thought that toxic substances might be produced in the burned tissue.

Part II describes the author's work. He accepts the classical clinical picture as described by WILSON. When animals are so burned that death occurs after some days, the changes in the body fluids (*syndrome humoral*) are constant:– progressive anaemia, increasing albuminuria and the onset of nephritis, a fall in the total chlorides and nitrogen in the urine, increase in blood urea and non-protein nitrogen, a progressive increase in globulin and decrease in albumin (the inversion of the albumin: globulin ratio causing a lowered osmotic pressure), a fall in chlorides for all the elements, progressive falling of the reserve alkali and an increase in cholesterin in proportion to the gravity of the symptoms. The author found that amputation of a limb of which the whole of the skin had been burned, up to six hours after burning prevented death, but if it was delayed to the 12th hour death followed in 5-10 days. When perfusion of a burned graft was allowed to continue for ten hours the usual blood changes followed. He considers the phenomena associated with fatal cases to be due to a toxin which acts selectively on the brain, since such phenomena occur in a normal animal when the brain alone is perfused for six hours with the blood of a burned animal.

The author arrives at the general conclusion that during the first hours following a burn which is extensive, though not sufficiently severe to cause immediate death, a toxic principle circulates in the blood.

The toxin is considered to damage certain brain centres, notably in the anterior hypothalamus. The lesions give rise to physical and chemical modifications of the blood constants and to nephritis characterized by low blood chloride and high blood nitrogen.

The bibliography extends to 314 references, and a complete record of each of the 148 animals employed supports the text.—R. BAMFORD.

FISHER, R. A. [Sc.D., F.R.S., Galton Professor, University of London]. (1938). **Statistical Methods for Research Workers.** pp. vi+356. 12 figs., 72 tables. [Numerous refs.] Edinburgh: Oliver & Boyd. [7th Edit.] [8vo] [15s.]

This book remains, and is likely to remain for many years, the classic of its kind. That seven editions have been published since 1925 is a fact which speaks for itself. The ordinary biologist, to whom it was originally addressed, may find it rather too advanced, and it is clear that its public now includes more than the ordinary research worker. No one will regard it as a book to be picked up and read lightly; nevertheless, for the most part it is not fundamentally difficult to understand.

One or two additions have been made to this edition and paragraph 49·2, with its example 46·2, is likely to prove of considerable value to the biological worker.

The book is too well established to need an extensive review. No higher praise of it can be given.—F. W. PRIESTLEY.

HOLMAN, L. J. [B.Sc. (Lond.)]. (1938). **Simplified Statistics.** pp. xi+142. 12 figs., 7 tables. [15 refs.] London: Sir Isaac Pitman & Sons, Ltd. [8vo] [3s. 6d.]

The author has made an honest but not highly successful attempt to write a book on statistical methods that can be read like a novel. He has adopted the annoying manner, for which he has indirectly apologized in the foreword, of treating his reader as an intellectual inferior; one would imagine that this could have been avoided without in any way complicating the subject.

The subject matter is treated in an orthodox and almost stereotyped manner, going steadily from distributions, through estimates of error to correlation and probability. Little or no mention is made of the technique of dealing with small samples, a side of statistical methods which is of prime importance to biologists.

In short this book cannot conscientiously be recommended to research workers, to whom, incidentally, it is not primarily addressed. The research worker wanting an introduction to statistics will find that better primers have been written previously.—F. W. PRIESTLEY.

Addresses of Bureaux.

IMPERIAL BUREAU OF SOIL SCIENCE,
Rothamsted Experimental Station, Harpenden, Herts., England.

IMPERIAL BUREAU OF ANIMAL NUTRITION,
The Reid Library, Rowett Research Institute, Bucksburn, Aberdeen, Scotland.

IMPERIAL BUREAU OF ANIMAL HEALTH,
Veterinary Laboratory, Ministry of Agriculture and Fisheries, Weybridge, Surrey, England.

IMPERIAL BUREAU OF ANIMAL BREEDING AND GENETICS,
King's Buildings, West Mains Road, University of Edinburgh, Scotland.

IMPERIAL BUREAU OF AGRICULTURAL PARASITOLOGY (HELMINTHOLOGY).
Winches Farm, Hatfield Road, St. Albans, Herts., England.

IMPERIAL BUREAU OF PLANT BREEDING AND GENETICS,
School of Agriculture, Cambridge, England.

IMPERIAL BUREAU OF PASTURES AND FORAGE CROPS,
Agricultural Buildings, Alexandra Road, Aberystwyth, Wales.

IMPERIAL BUREAU OF HORTICULTURE AND PLANTATION CROPS,
East Malling Research Station, East Malling, Kent, England.

IMPERIAL BUREAU OF DAIRY SCIENCE,
National Institute for Research in Dairying, Shinfield, Nr Reading, England.

IMPERIAL FORESTRY BUREAU,
39, Museum Road, Oxford, England.

INDEX VETERINARIUS

The publication of *Index Veterinarius* commenced with the indexing of the literature of 1933. It is a complete index of current publications relating to veterinary research, public health, administration, education and other aspects of veterinary science.

The latest list of the publications indexed for this purpose was included in *Index Veterinarius,* Vol. 6, No. 1 (issued December, 1938) and also circulated with the *Veterinary Bulletin,* Vol. 9, No. 1.

About 10,000 references are indexed each year, each reference being suitably cross-indexed alphabetically under subjects and under names of authors.

As each half-yearly issue consists of a single complete alphabetical index of subjects and authors' names, a search through it involves a minimum of trouble, and all information required is readily found.

Each number contains the indexing done by the Bureau during the previous half-year, *i.e.,* No. 1, issued in December, covers the indexing done during the previous January to June.

The dates of issue of the two numbers of each volume are as follows:—

No. 1.—Issued December. Indexing period previous January—June.
No. 2.—Issued June. Indexing period previous July—December.

Vols. 1 to 3 (1933, 1934 and 1935) of the Index were produced on a duplicator; from Vol. 4 onwards it has been printed.

Vols. 1 to 5 were issued in quarterly parts; the issue is now half-yearly.

Annual Subscription, £5.

A limited number of copies printed on one side only are available for those who wish to mount references on cards.

Orders may be sent to:—

IMPERIAL BUREAU OF ANIMAL HEALTH,
NEW HAW, WEYBRIDGE,
SURREY, ENGLAND.

Printed in Great Britain
by
H. R. Grubb, Ltd., Croydon.